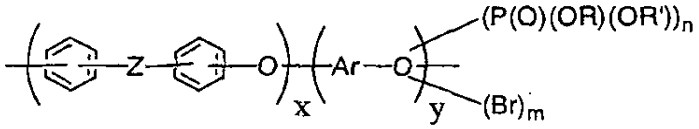
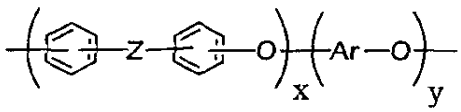
What is claimed is:

1. An aromatic polymer phosphonic acid derivative, which is represented by the formula (2),



(2)

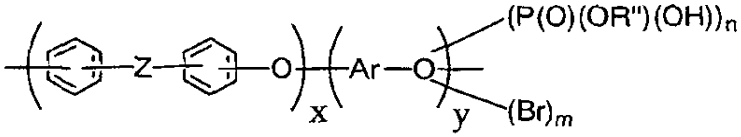
wherein -Z- represents $-SO_2-$ or -CO-, x and y are average molar ratios in the polymer and respectively represent 0.01 to 0.99, provided that the sum of x and y is 1; -Ar- represents a divalent aromatic group having 4 to 18 carbon atoms which may contain hetero atom, and said -Ar- may have one or more substituents; R and R' each independently represent an alkyl group; m and n independently represent an average number of substituents per unit structure (-Ar-O-) of an aromatic polymer compound (1),



(1)

m is 0 to 8, n is a positive number of 8 or less, and the sum of m and n is 8 or less; or

an aromatic polymer phosphonic acid derivative whose free acid form is represented by the formula (3):



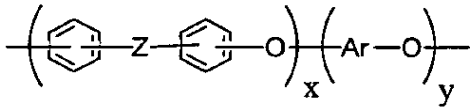
(3)

wherein -Z-, x, y, -Ar- m and n have the same meaning as above,

and R'' represents hydrogen or an alkyl group.

2. The phosphonic acid derivative according to claim 1, wherein -Ar- is a phenylene group which may have one or more substituents or a biphenyldiyl group which may have one or more substituents.

3. A process for producing an aromatic polymer phosphonic acid derivative represented by the above formula (2), wherein the process comprises brominating an aromatic polymer compound represented by the formula (1):



(1)

wherein -Z-, x, y and -Ar- have the same meaning as above, with a brominating agent, and acting thereon a trialkyl phosphite represented by the formula (4):

$$P(OR)(OR')(OR''') \qquad (4)$$

wherein R, R' and R''' each independently represent an alkyl group, in the presence of a nickel halide catalyst in an organic solvent.

4. A process for producing an aromatic polymer phosphonic acid derivative of the free acid form represented by the above formula (3), wherein the process comprises brominating an aromatic polymer compound represented by the formula (1) with a brominating agent, and acting thereon a trialkyl phosphite represented by the above formula (4) in the presence of a nickel

halide catalyst in an organic solvent to give an aromatic polymer phosphonic acid derivative represented by the above formula (2), and then hydrolyzing said acid derivative.

5. The process according to claim 3 or 4, wherein nickel chloride (II) is used as the nickel halide.

6. The process according to claim 3 or 4, wherein an amide compound is used as the organic solvent.

7. The process according to claim 3 or 4, wherein at least one compound selected from trimethyl phosphite and triethyl phosphite is used as the trialkyl phosphite.

8. A process for producing an aromatic polymer phosphonic acid derivative of the free acid form represented by the above formula (3), wherein the process comprises hydrolyzing the aromatic polymer phosphonic acid derivative represented by the above formula (2).

9. The process according to claim 4 or 8, wherein the hydrolysis is carried out in the presence of an alkali.

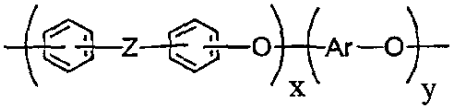
10. The process according to claim 4 or 8, wherein the hydrolysis is carried out in the presence of an acid.

11. The process according to claim 4 or 8, wherein the hydrolysis is carried out after acting a trialkyl silyl halide on the phosphonic acid di-ester.

12. The process according to claim 3 or 4, wherein -Ar- is a phenylene group which may have one or more substituents or

a biphenyldiyl group which may have one or more substituents.

13. A process for brominating an aromatic polymer compound represented by the formula (1) with N-bromosuccinimide in the presence of a strong acid in an organic solvent,



(1)

wherein -Z- represents $-SO_2-$ or -CO-, x and y respectively represent 0.01 to 0.99, provided that the sum of x and y is 1; -Ar- represents a divalent aromatic group having 4 to 18 carbon atoms which may contain hetero atom, and said -Ar- may have one or more substituents.

14. The process according to claim 13, wherein -Ar- is a phenylene group which may have one or more substituents or a biphenyldiyl group which may have one or more substituents.

15. The process according to claim 13 or 14, wherein the strong acid is sulfuric acid.

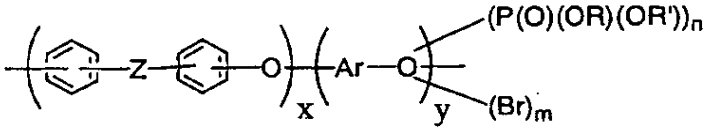
16. The process according to claim 13 or 14, wherein the organic solvent contains at least one selected from halogenated methanes and halogenated ethanes.

17. A polymer electrolyte comprising, as an active ingredient, an aromatic polymer phosphonic acid derivative represented by the above formula (2) and/or an aromatic polymer phosphonic acid derivative of the free acid form represented by the above formula (3).

18. A polymer electrolyte membrane in which the polymer electrolyte according to claim 17 is used.

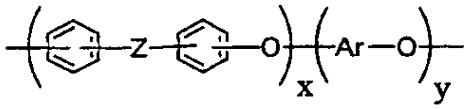
What is claimed is:

1. An aromatic polymer phosphonic acid derivative, which is represented by the formula (2),



(2)

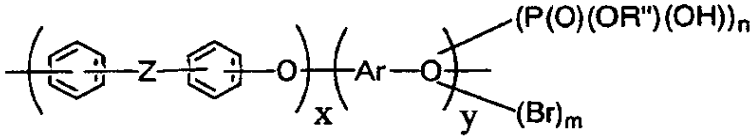
wherein -Z- represents $-SO_2-$ or -CO-, x and y are average molar ratios in the polymer and respectively represent 0.01 to 0.99, provided that the sum of x and y is 1; -Ar- represents a divalent aromatic group having 4 to 18 carbon atoms which may contain hetero atom, and said -Ar- may have one or more substituents; R and R' each independently represent an alkyl group; m and n independently represent an average number of substituents per unit structure (-Ar-O-) of an aromatic polymer compound (1),



(1)

m is 0 to 8, n is a positive number of 8 or less, and the sum of m and n is 8 or less; or

an aromatic polymer phosphonic acid derivative whose free acid form is represented by the formula (3):



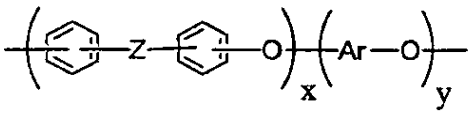
(3)

wherein -Z-, x, y, -Ar- m and n have the same meaning as above,

and R'' represents hydrogen or an alkyl group.

2. The phosphonic acid derivative according to claim 1, wherein -Ar- is a phenylene group which may have one or more substituents or a biphenyldiyl group which may have one or more substituents.

3. A process for producing an aromatic polymer phosphonic acid derivative represented by the above formula (2), wherein the process comprises brominating an aromatic polymer compound represented by the formula (1):



(1)

wherein -Z-, x, y and -Ar- have the same meaning as above, with a brominating agent, and acting thereon a trialkyl phosphite represented by the formula (4):

$$P(OR)(OR')(OR''') \qquad (4)$$

wherein R, R' and R''' each independently represent an alkyl group, in the presence of a nickel halide catalyst in an organic solvent.

4. A process for producing an aromatic polymer phosphonic acid derivative of the free acid form represented by the above formula (3), wherein the process comprises brominating an aromatic polymer compound represented by the formula (1) with a brominating agent, and acting thereon a trialkyl phosphite represented by the above formula (4) in the presence of a nickel

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=> display history full l1-


     FILE 'HCAPLUS' ENTERED AT 18:21:17 ON 29 OCT 2003
L1        47352 SEA SASAKI ?/AU OR SHIGERU ?/AU
L2         1660 SEA YASHIRO ?/AU OR ARITHIRO ?/AU
L3         5476 SEA HIDAKA ?/AU OR YASUAKI ?/AU
L4            2 SEA L1 AND L2 AND L3
                SEL L4 1-2 RN

     FILE 'REGISTRY' ENTERED AT 18:28:16 ON 29 OCT 2003
L5            6 SEA (83094-08-0/BI OR 122-52-1/BI OR 25839-81-0/BI OR

L6            3 SEA L5 AND PMS/CI
L7            0 SEA L5 AND BR/ELS
L8            2 SEA L5 AND P/ELS

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L11       62922 SEA BROMINAT?
L12           4 SEA L9 AND L10
L13          10 SEA L9 AND L11
L14           3 SEA L12 AND L13

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L24           0 SEA L22 AND L23
                E N-BROMOSUCCINIMIDE/CN
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                E BROMINE/CN
L26           1 SEA BROMINE/CN
L27      105243 SEA (C(L)H(L)O(L)P)/ELS (L) 4/ELC.SUB
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L33          42 SEA L23
L34           1 SEA L33 AND L32
L35          17 SEA L22
L36           0 SEA L35 AND L31
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L38          11 SEA L37 AND L32
L39      126519 SEA L25 OR L26 OR BROMOSUCCINIMIDE# OR NBS OR BROMINE#
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L40           0 SEA L35 AND L39
L41          24 SEA L37 AND L39
L42           3 SEA L41 AND L38
L43       21110 SEA POLYSULFONE#
L44       73781 SEA POLYETHER#
L45       10167 SEA L43 AND L44
L46         205 SEA L45 AND L32
L47           4 SEA L46 AND L39
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L51          12 SEA L48(L)L49
L52          12 SEA L48(25A)L49
L53           4 SEA L50 AND L39
L54       80337 SEA (PROTON? OR H)(2A)(CONDUCT? OR COND# OR TRANSPORT?
                OR DIFFUS? OR SUFFUS? OR INFUS? OR EFFUS? OR MIGRAT? OR
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                TRANSFER?)
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L58           QUE MEMBRAN?
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L60          15 SEA L50 AND L58
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L63          31 SEA (L13 OR L38 OR L51 OR L52 OR L56 OR L60) NOT L61
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L65          12 SEA L50 NOT (L61 OR L63 OR L64)
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L66 2 SEA L61 AND L4

FILE 'REGISTRY' ENTERED AT 19:14:00 ON 29 OCT 2003

=> d l22 que stat
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O—Cy^G1—O Cb @7
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REP G1=(0-1) 7
NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM
GGCAT IS UNS AT 2
GGCAT IS UNS AT 7
DEFAULT ECLEVEL IS LIMITED

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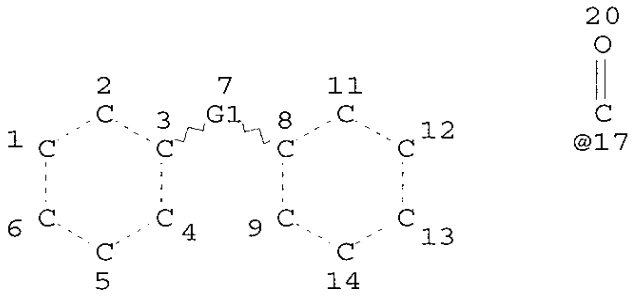
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 5

STEREO ATTRIBUTES: NONE
L16 STR



VAR G1=SO2/17
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DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:
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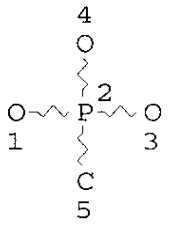
L20 STR



NODE ATTRIBUTES:
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DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED

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RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 5

STEREO ATTRIBUTES: NONE
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100.0% PROCESSED 39 ITERATIONS 39 ANSWERS
SEARCH TIME: 00.00.01

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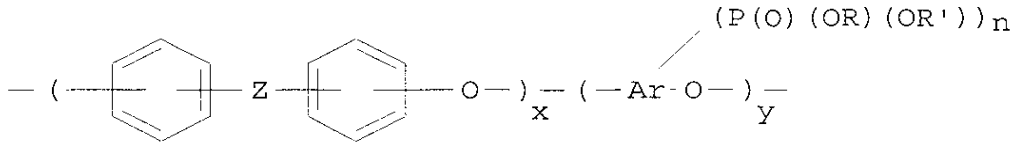
=> d l61 1-8 cbib abs hitstr hitind

L61 ANSWER 1 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:554038 Document No. 139:119905 Proton-conducting sulfonated **polysulfone-polyethers** and polyketone-**polyethers** as fuel cell **separators**. Sasaki, Shigeru; Yashiro, Arihiro; Hidaka, Yasuaki; Taniguchi, Yakumi (Sumitomo Chemical Company Limited, Japan). Fr. Demande FR 2834716 A1 20030718, 36 pp. (French). CODEN: FRXXBL. APPLICATION: FR 2003-385 20030115. PRIORITY: JP 2002-5797 20020115; JP 2002-5796 20020115.
GI



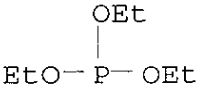
I

AB Proton-conducting polymer membranes, esp. for fuel cells, are **phosphonic** acid-contg. **polyether**-polyketones or **polyether-polysulfones**, of general structure I, in which Z = -SO2- or -C(:O)-; x and y = 0.01-0.99 (x + y = 1); -Ar- is a C4-18-arylene and can contain heteroatoms; n .ltoreq.8; and R and R' = H or alkyl, in addn. to at least one other component selected from phosphoric acid (or deriv.) and a polymer electrolyte. The polymer has a proton cond. of .gtoreq.1 .times. 10-4 S/cm. The phosphoric acid deriv. has the general formula O:P(OR2)k(OH)3-k, in which R2 = C1-6-alkyl or an aryl group, and; k = 0-2. The **phosphonic** acid groups are grafted onto the polymer by **bromination** with N-**bromosuccinimide**, followed by reaction with tri-Et **phosphite** in the presence of NiCl2.

IT **122-52-1DP**, Triethyl **phosphite**, reaction products with sulfonated **brominated polysulfone-polyethers 25839-81-0DP**, Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene), sulfonated, **brominated**, reaction products with tri-Et **phosphite 83094-08-0DP**, sulfonated
(membranes; proton-conducting sulfonated **polysulfone-polyethers** and polyketone-**polyethers** as fuel cell **separators**)

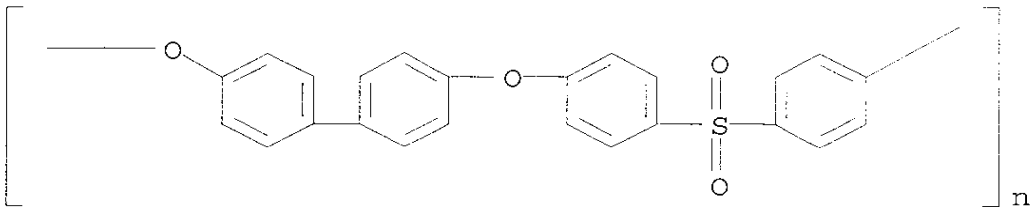
RN 122-52-1 HCAPLUS

CN Phosphorous acid, triethyl ester (8CI, 9CI) (CA INDEX NAME)



RN 25839-81-0 HCAPLUS

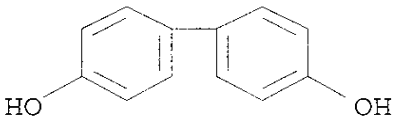
CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



RN 83094-08-0 HCAPLUS
CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

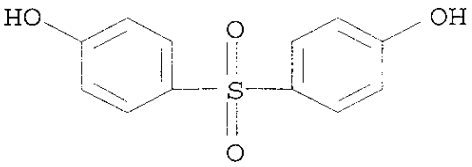
CM 1

CRN 92-88-6
CMF C12 H10 O2



CM 2

CRN 80-09-1
CMF C12 H10 O4 S



CM 3

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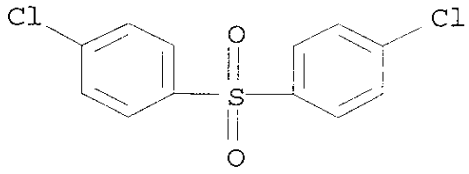
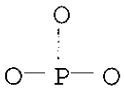


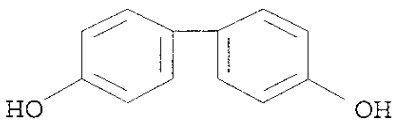
IT **13598-36-2DP**, **Phosphonic** acid, aryl and polymeric derivs. **174899-22-0DP**, sulfonated
(membranes; proton-conducting sulfonated **polysulfone-polyethers** and polyketone-**polyethers** as fuel cell **separators**)
RN 13598-36-2 HCAPLUS
CN Phosphonic acid (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



*** FRAGMENT DIAGRAM IS INCOMPLETE ***
RN 174899-22-0 HCAPLUS
CN [1,1'-Biphenyl]-4,4'-diol, polymer with 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

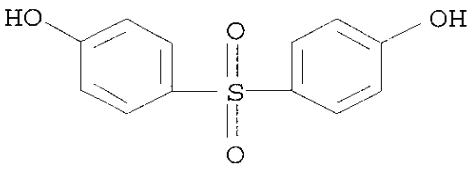
CM 1

CRN 92-88-6
CMF C12 H10 O2



CM 2

CRN 80-09-1
CMF C12 H10 O4 S



IC ICM C08L071-12
ICS C08K005-521; C08J005-22; H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST fuel cell proton conducting membrane **polysulfone** **polyether**; sulfonated **polysulfone** **polyether** fuel cell membrane; polyketone **polyether** fuel cell proton conducting membrane
IT Polyketones
Polysulfones, uses
(**polyether**-, arom., sulfonated, **phosphonic** acid-contg.; proton-conducting sulfonated **polysulfone-polyethers** and polyketone-**polyethers** as fuel cell **separators**)
IT **Polysulfones**, uses
(**polyether**-polyoxyphenylene-, arom., block, sulfonated, **phosphonic** acid-contg.; proton-conducting sulfonated **polysulfone-polyethers** and polyketone-**polyethers** as fuel cell **separators**)
IT Polyoxyphenylenes
(**polyether-polysulfone**-, arom., block, sulfonated, **phosphonic** acid-contg.; proton-conducting sulfonated **polysulfone-polyethers** and polyketone-**polyethers** as fuel cell **separators**)
IT **Polyethers**, uses
(polyketone-, arom., sulfonated, **phosphonic** acid-contg.; proton-conducting sulfonated **polysulfone-polyethers** and polyketone-**polyethers** as fuel cell **separators**)
IT **Polyethers**, uses
(polyoxyphenylene-**polysulfone**-, arom., block, sulfonated, **phosphonic** acid-contg.; proton-conducting sulfonated **polysulfone-polyethers** and polyketone-**polyethers** as fuel cell **separators**)
IT **Polyethers**, uses
(**polysulfone**-, arom., sulfonated, **phosphonic** acid-contg.; proton-conducting sulfonated **polysulfone-polyethers** and polyketone-**polyethers** as fuel cell **separators**)
IT Fluoropolymers, uses
(porous substrates; proton-conducting sulfonated

polysulfone-polyethers and polyketone-**polyethers** as fuel cell **separators**)

IT Fuel cell **separators**
(proton-conducting sulfonated **polysulfone-polyethers** and polyketone-**polyethers** as fuel cell **separators**)

IT Ionic conductivity
(proton; proton-conducting sulfonated **polysulfone-polyethers** and polyketone-**polyethers** as fuel cell **separators**)

IT **122-52-1DP**, Triethyl **phosphite**, reaction products with sulfonated **brominated polysulfone-polyethers 25839-81-0DP**, Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene), sulfonated, **brominated**, reaction products with tri-Et **phosphite** **83094-08-0DP**, sulfonated **83094-08-0DP**, sulfonated, **brominated**, reaction products with tri-Et **phosphite**
(membranes; proton-conducting sulfonated **polysulfone-polyethers** and polyketone-**polyethers** as fuel cell **separators**)

IT **13598-36-2DP**, **Phosphonic** acid, aryl and polymeric derivs. **174899-22-0DP**, sulfonated
(membranes; proton-conducting sulfonated **polysulfone-polyethers** and polyketone-**polyethers** as fuel cell **separators**)

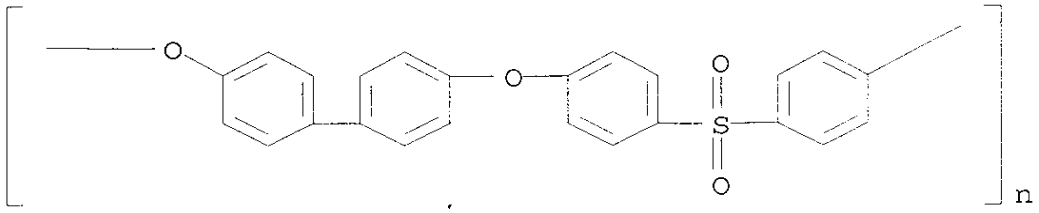
L61 ANSWER 2 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:352062 Document No. 138:354944 Proton-conductive membrane for electrochemical applications. Jakoby, Kai; Nunes, Suzana Pereira; Peinemann, Klaus-Victor (GKSS-Forschungszentrum Geesthacht G.m.b.H., Germany). Ger. Offen. DE 10148131 A1 20030508, 4 pp. (German). CODEN: GWXXBX. APPLICATION: DE 2001-10148131 20010928.

AB A proton-conductive membranes for electrochem. applications, in particular for fuel cells, are manufd. by attaching **phosphonic** acid groups to arom. rings of nonvinyl polymers such as polysulfones without spacer groups between the rings and the **phosphonic** acid groups. Optionally, the polymers also have sulfonic acid groups directly bonded to the arom. rings.

IT **25839-81-0DP**, **phosphonic** acid derivs.
(proton-conductive membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)

RN 25839-81-0 HCAPLUS

CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



IC ICM C08J005-22
ICS C08G075-20; B01D071-82; H01M008-02
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52
ST polysulfone **phosphonated** proton conductive membrane fuel cell; sulfonated **phosphonated** polymer proton conductive membrane fuel cell
IT Polysulfones, uses
(**phosphonic** acid derivs.; proton-conductive membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)
IT Polysulfones, uses
(polyether-, **phosphonic** acid derivs.; proton-conductive membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)
IT Polyethers, uses
(polysulfone-, **phosphonic** acid derivs.; proton-conductive membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)
IT Fuel cells
Ionic conductors
Membranes, nonbiological
(proton-conductive membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)
IT **25839-81-0DP**, **phosphonic** acid derivs.
(proton-conductive membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)

L61 ANSWER 3 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:282877 Document No. 138:306811 Oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**. Lehmann, Dieter; Meier-Haack, Jochen; Vogel, Claus; Taeger, Antje; Pereira Nunes, Suzana; Paul, Dieter; Peinemann, Klaus-viktor; Jakoby, Kai (Institut Fuer Polymerforschung Dresden E.V., Germany; Gkss-Forschungszentrum Geesthacht Gmbh). PCT Int. Appl. WO 2003030289 A2 20030410, 30 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF,

BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (German). CODEN: PIXXD2. APPLICATION: WO 2002-DE3736 20020927. PRIORITY: DE 2001-10149716 20010928.

AB Fuel cell polymer membranes, esp. with improved methanol retention capacity for direct methanol fuel cells, comprises one or more sepg. layers consisting of diblock or multiblock copolymers, with general segment structures A-(B-A)k, B-(A-B)l, and (A-B)m (k .gtoreq.1, l .gtoreq.1, and m .gtoreq.1), in which the block segment (A) comprises an oligomer segment that is non-conducting to electrons and non-conducting to protons, and the block segment (B) comprises an oligomer segment that is conducting to protons and non-conducting to electrons. Block segments (A) and (B) are selected from oligoarylimide, oligoaryl sulfide, oligoaryl ether sulfone, oligoaryl ether, oligoaryl ether ketone, oligoarylene ether ether ketone, oligoaramide, oligoaryl urea, oligoarylene oxadiazole, oligoarylene sulfonamide, oligobenzimidazole, oligobenzoxazole, oligobenzthiazole, and oligoquinoline segments, with d.p. 2-50, optionally in combination with proton-conducting groups, such as sulfonic acids, **phosphonic** acids, (perfluoro)alkylsulfonic acids, (perfluoro)**alkylphosphonic** acids, (perfluoro)alkenecarboxylic acids, triazine groups, tertiary-amino groups, and quaternary ammonium groups.

IC ICM H01M008-10
ICS C08J005-22; B01D071-80
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

IT Perfluoro compounds
(alkanesulfonic acids, arom. block polyimides contg.; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Sulfonic acids, uses
(alkanesulfonic, perfluoro, arom. block polyimides contg.; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Sulfonic acids, uses
(arom. block polyimides contg.; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Polyimides, uses
(arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Perfluoro compounds
(carboxylic acids, arom. block polyimides contg.; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Polyimides, uses
(epoxy, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Conducting polymers

Fuel cell **separators**
(oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Carboxylic acids, uses
(perfluoro, arom. block polyimides contg.; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Polyimides, uses
(polyamide-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Polyimides, uses
(polybenzimidazole-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Polyimides, uses
(polybenzoxazole-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Polyimides, uses
(polyether-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Polyketones
Polysulfones, uses
(**polyether**-polyimide-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Polyimides, uses
(polyether-polyketone-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Polyimides, uses
(**polyether-polysulfone**-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Epoxy resins, uses
Polyamides, uses
Polybenzimidazoles
Polybenzoxazoles
Polyethers, uses
Polyketones
Polysulfides
Polysulfonamides
Polyureas
(polyimide-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

IT Polyoxadiazoles
Polyquinolines
(polyimide-, block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer

separators)
IT Polyethers, uses
(polyimide-polyketone-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
IT **Polyethers**, uses
(polyimide-**polysulfone**-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
IT Polyimides, uses
(polyketone-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
IT Polyimides, uses
(polyoxadiazole-, block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
IT Polyimides, uses
(polyquinoline-, block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
IT Polyimides, uses
(polysulfide-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
IT Polyimides, uses
(polysulfonamide-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
IT Polyimides, uses
(polyurea-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
IT Polythiophenylenes
(substrate; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
IT Functional groups
(triazino- and quaternary ammonio-, arom. block polyimides contg.; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
IT 507471-35-4P 507471-36-5P 507471-37-6P 507471-38-7P
507471-39-8P 507488-67-7P 507488-68-8P
(fuel cell **separator**; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
IT 9046-51-9P 25135-51-7P 32169-85-0P 63943-11-3P 87092-09-9P
507471-30-9P 507471-31-0P 507471-33-2P 507471-34-3P
507471-40-1P 508186-74-1P 508189-27-3P 508189-33-1P
(prepn. and block polymn. of; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell

polymer **separators**)

IT 13598-36-2DP, **Phosphonic** acid, polymers with arom. block polyimides
(**separators**; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)

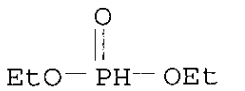
L61 ANSWER 4 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:230866 Document No. 139:22602 Palladium-catalyzed **phosphonation** of polyphenylsulfone. Jakoby, Kai; Peinemann, K. V.; Nunes, Suzana P. (GKSS Research Center, Institute of Chemistry, Geesthacht, D-21502, Germany). Macromolecular Chemistry and Physics, 204(1), 61-67 (English) 2003. CODEN: MCHPES. ISSN: 1022-1352. Publisher: Wiley-VCH Verlag GmbH & Co. KGaA.

AB An efficient synthetic procedure for the **phosphonation** of arom. polymers was developed and is here exemplified for Radel R-5000 [poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene)]. This procedure involved the **bromination** of the polymer and the subsequent **bromine**-phosphorus exchange by means of a Pd(0)-catalyzed P-C coupling reaction. In the resulting product, the **phosphonate** ester pendant groups were attached to arom. rings of the polymer chain without alkylene spacer units. A substitution degree of almost one **phosphonate** moiety per repeating unit of the polymer was achieved in the presence of Pd2(dba)3.cntdot.CHCl3 as catalyst at 120.degree.C. Polymers with free **phosphonic** acid groups were prepd. by ester hydrolysis.

IT **762-04-9DP**, Diethyl **phosphite**, reaction products with biphenyl-contg. **polyether polysulfones**
(palladium-catalyzed **phosphonation** of biphenyl-contg. **polyether polysulfones**)

RN 762-04-9 HCAPLUS

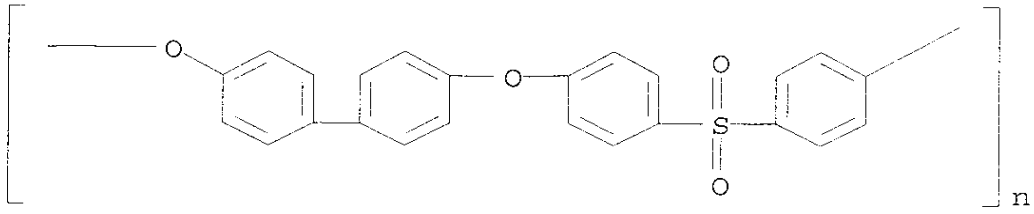
CN Phosphonic acid, diethyl ester (8CI, 9CI) (CA INDEX NAME)



IT **25839-81-0DP**, Radel R-5000, **phosphonic** acid derivs.
(palladium-catalyzed **phosphonation** of biphenyl-contg. **polyether polysulfones**)

RN 25839-81-0 HCAPLUS

CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



CC 35-8 (Chemistry of Synthetic High Polymers)
ST biphenyl **polyether polysulfone** **phosphonation** palladium catalyzed
IT Phosphonylation catalysts
(palladium-catalyzed **phosphonation** of biphenyl-contg. **polyether polysulfones**)
IT **Polysulfones**, preparation
(**polyether**-, arom., **phosphonated**; palladium-catalyzed **phosphonation** of biphenyl-contg. **polyether polysulfones**)
IT **Polyethers**, preparation
(**polysulfone**-, arom., **phosphonated**; palladium-catalyzed **phosphonation** of biphenyl-contg. **polyether polysulfones**)
IT 14221-01-3, Tetrakis(triphenylphosphine)palladium 52522-40-4, Tris(dibenzylideneacetone)dipalladium-chloroform adduct
(palladium-catalyzed **phosphonation** of biphenyl-contg. **polyether polysulfones**)
IT **762-04-9DP**, Diethyl **phosphite**, reaction products with biphenyl-contg. **polyether polysulfones**
(palladium-catalyzed **phosphonation** of biphenyl-contg. **polyether polysulfones**)
IT **25839-81-0DP**, Radel R-5000, **phosphonic** acid derivs.
(palladium-catalyzed **phosphonation** of biphenyl-contg. **polyether polysulfones**)

L61 ANSWER 5 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
2002:734081 Document No. 137:250314 Mesoporous network electrode for electrochemical cell. Sugnaux, Francois; Pappas, Nicholas; Graetzel, Michael (Switz.). Eur. Pat. Appl. EP 1244168 A1 20020925, 22 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR. (English). CODEN: EPXXDW. APPLICATION: EP 2001-810286 20010320.
AB A high kinetics rate electrochem. cell in which at least one of the electrodes is composed of a mesostructural electroactive material is comprising a three-dimensional framework structure of mesoporous texture forming a bi-continuous junction of large sp. surface area with the electrolyte. The electrode material, which is suited for reversible ion intercalation and for electronic transport, is penetrated by an interconnected porous space filled with electrolyte the latter serving for ionic transport. The three dimensional

framework structure of the electrode is designed in a manner to overcome impediment of ionic diffusion in the electrolyte encountered with conventional high surface area electrodes and to provide interconnectivity, mech. stability of the solid phase as well as access of the electrolyte to the entire pore space. A low temp. method of prepn. of the electrodes employs a high-speed deposition of the elec. active material in the form of a thin film. The application of the electrodes in high power lithium ion insertion batteries, photovoltaic cells, supercapacitors and fast electrochromic devices is disclosed.

IC ICM H01M010-40
ICS H01M004-36; H01G009-20; H01G009-00; G02F001-15

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 74, 76

IT **Polysulfones**, uses
(**polyether**-, acryloylated, binder; mesoporous network electrode for electrochem. cell)

IT Polyimides, uses
Polysulfones, uses
(**polyether**-, binder; mesoporous network electrode for electrochem. cell)

IT **Polysulfones**, uses
(**polyether**-, chloromethylated, binder; mesoporous network electrode for electrochem. cell)

IT **Polyethers**, uses
(**polysulfone**-, acryloylated, binder; mesoporous network electrode for electrochem. cell)

IT **Polyethers**, uses
(**polysulfone**-, binder; mesoporous network electrode for electrochem. cell)

IT **Polyethers**, uses
(**polysulfone**-, chloromethylated, binder; mesoporous network electrode for electrochem. cell)

IT 92-84-2D, Phenothiazine, **phosphonated** 7440-44-0, Carbon, uses 7782-42-5, Graphite, uses 9003-29-6, Polybutylene
(mesoporous network electrode for electrochem. cell)

IT 1314-23-4, Zirconia, uses 1314-61-0, Tantala 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 7631-86-9D, Silica, silanized
(**separator**; mesoporous network electrode for electrochem. cell)

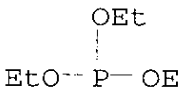
L61 ANSWER 6 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
2002:693172 Document No. 137:201741 Aromatic **polyether** containing **phosphonate** groups and a process for the manufacture thereof. Sasaki, Shigeru; Yashiro, Arihiro; Hidaka, Yasuaki (Sumitomo Chemical Company, Limited, Japan). Eur. Pat. Appl. EP 1238998 A1 20020911, 15 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR. (English). CODEN: EPXXDW. APPLICATION: EP 2002-3124 20020213. PRIORITY: JP 2001-38116 20010215; JP 2001-125501 20010424; JP 2001-379819 20011213.

AB Provided is an arom. polymer **phosphonic** acid deriv. in

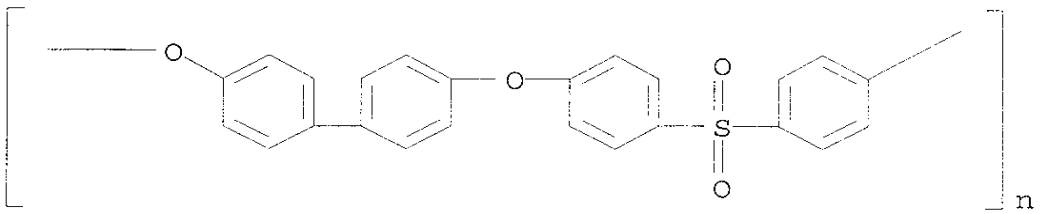
which a **phosphonic** acid deriv. group is directly bound to an arom. ring. The arom. polymer **phosphonic** acid deriv. can be produced by **brominating** a specific arom. polymer compd. with a **brominating** agent, then acting thereon trialkyl **phosphite** in the presence of a nickel halide catalyst to give a **phosphonic** acid di-ester, and further, by hydrolyzing the di-ester. The arom. polymer **phosphonic** acid deriv. is excellent in radical resistance and used for a solid polymer type fuel cell. A polymer with repeating unit p-C6H4SO2-p-C6H4O-p-C6H4-pC6H4O was **brominated** with N-**bromosuccinimide**, then treated with tri-Et phosphate.

IT **122-52-1DP**, Triethyl **phosphite**, reaction products with **brominated polyether-polysulfones** **25839-81-0DP**, **brominated**, reaction products with tri-Et **phosphite 83094-08-0DP**, 4,4'-Biphenol-4,4'-dichlorodiphenyl sulfone-4,4'-dihydroxydiphenyl sulfone copolymer, **brominated**
(arom. **polyether** contg. **phosphonate** groups and a process for the manuf. thereof)

RN 122-52-1 HCAPLUS
CN Phosphorous acid, triethyl ester (8CI, 9CI) (CA INDEX NAME)



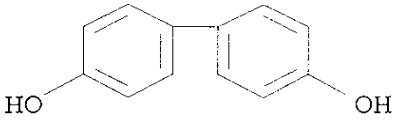
RN 25839-81-0 HCAPLUS
CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



RN 83094-08-0 HCAPLUS
CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

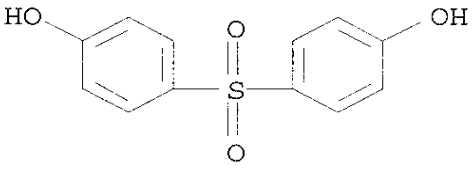
CM 1

CRN 92-88-6
CMF C12 H10 O2



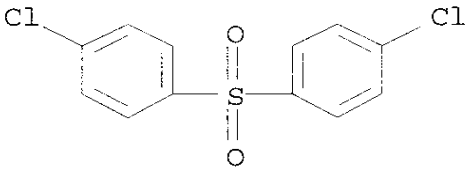
CM 2

CRN 80-09-1
CMF C12 H10 O4 S



CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



IC ICM C08G075-23
ICS C08G065-48; B01D071-52; B01D071-68
CC 35-5 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 52
ST arom **polyether phosphonate** group electrolyte membrane
IT **Bromination**
Polymer electrolytes
(arom. **polyether** contg. **phosphonate** groups and a process for the manuf. thereof)
IT Polyoxyarylenes
(**phosphonate** group-contg.; arom. **polyether** contg. **phosphonate** groups and a process for the manuf. thereof)
IT **Polysulfones**, preparation
(**polyether-**, **phosphonate** group-contg.; arom.

polyether contg. **phosphonate** groups and a process for the manuf. thereof)

IT Membranes, nonbiological
(polymer electrolyte; arom. **polyether** contg. **phosphonate** groups and a process for the manuf. thereof)

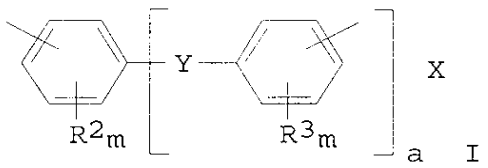
IT **Polyethers**, preparation
(**polysulfone**-, **phosphonate** group-contg.; arom. **polyether** contg. **phosphonate** groups and a process for the manuf. thereof)

IT 7718-54-9, Nickel (II) chloride, uses
(arom. **polyether** contg. **phosphonate** groups and a process for the manuf. thereof)

IT **122-52-1DP**, Triethyl **phosphite**, reaction products with **brominated polyether-polysulfones**
25839-81-0DP, **brominated**, reaction products with tri-Et **phosphite** **83094-08-0DP**, 4,4'-Biphenol-4,4'-dichlorodiphenyl sulfone-4,4'-dihydroxydiphenyl sulfone copolymer, **brominated**
(arom. **polyether** contg. **phosphonate** groups and a process for the manuf. thereof)

L61 ANSWER 7 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
1992:153107 Document No. 116:153107 Flame-resistant, nondripping poly(alkylene terephthalate) molding compositions and their use.
Fuhr, Karl; Mueller, Friedemann; Ott, Karl Heinz (Bayer A.-G., Germany). Ger. Offen. DE 4007730 A1 19910912, 8 pp. (German).
CODEN: GWXXBX. APPLICATION: DE 1990-4007730 19900310.

GI



I

AB The title compns. (100 parts) contain, in addn. to poly(alkylene terephthalate), E1(P(O)(R1)OXO)nE2 **polyphosphonate** (R1 = alkyl or aryl; E1 = OH, aryloxy, OXOH; E2 = H or **phosphonate**; R2, R3 in X = alkyl or alkoxy; Y = alkylene; a = 0 or 1; m = 0-4) 5-30, antidrip agent 0.2-2, and arom. thermoplastic with Vicat B temp. .gtoreq.180.degree. 1-30 parts. These compns. have a V-O rating in the UL 94 test with minimal P content. Thus, a compn. of poly(ethylene terephthalate) (I) 56.3, bisphenol F-**methylphosphonic** acid copolymer (II) 5.0, polythiophenylene 10.0, PTFE 0.4, glass fibers 20.0, wax 0.3, BaSO3 2.0, and tetrabromobisphenol A polycarbonate 6.0 parts had a V-O rating and P content 0.6% and was nondripping. A compn. of I 62.3, II 15.0, PTFE 0.4, glass fibers 20.0, wax 0.3, and BaSO4 2.0 parts also had this

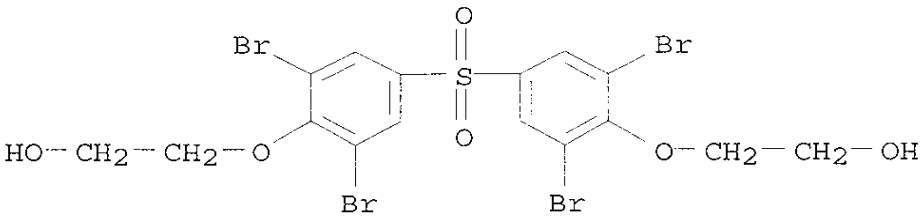
rating but contained 1.8% P.
IC ICM C08L067-02
ICS C08K005-5333; C08L085-02; C08L027-12
ICA C08L081-06; C08L081-02; C08L071-10; C08L071-12; C08L065-00
CC 37-6 (Plastics Manufacture and Processing)
IT Polycarbonates, uses
Polyesters, uses
Polyketones
Polyoxyphenylenes
Polysulfones, uses
Polythiophenylenes
(flame-resistant nondripping molding compns. contg.)
IT Polycarbonates, uses
(**bromine**-contg., oligomeric, flame-resistant nondripping molding compns. contg.)
IT Polyesters, uses
(**phosphonate** group-contg., flame-resistant nondripping molding compns. contg.)
IT Polyketones
(**polyether**-, flame-resistant nondripping molding compns. contg.)
IT **Polysulfones**, uses
(**polyether**-, arom., flame-resistant nondripping molding compns. contg.)
IT **Polyethers**, uses
(polyketone-, flame-resistant nondripping molding compns. contg.)
IT **Polyethers**, uses
(**polysulfone**-, arom., flame-resistant nondripping molding compns. contg.)

L61 ANSWER 8 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
1977:552880 Document No. 87:152880 Bromine-containing **phosphonate** copolymers. Okamoto, Kazuo; Yamanaka, Keio (Kanebo, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 52068293 19770606 Showa, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1975-144156 19751202.
AB Arom. dihydroxy compds., Br-contg. dihydroxy compds., and **phosphonic** dichloride derivs. are polymd. to give copolymers contg. 2-8:1 wt. ratios of Br and P which are useful as fireproofing agents for polyesters or polyamides. Thus, a mixt. of hydroquinone 77, **phenylphosphonic** dichloride 197, and ZnCl2 0.3 part was heated 2 h at 180.degree., 2 h at 200.degree., and 1 h at 230.degree., cooled to 160.degree., 189 parts 2,2-bis[3,5-dibromo-4-(2-hydroxyethoxy)phenyl]propane, heated 2 h at 160.degree., and evacuated 1 h at 160.degree. and 5 mm to give a copolymer (I) [64155-95-9] having mol. wt. 8570, m.p. 118.degree., and initial decompn. temp. 316.degree.. A blend of 100 parts poly(ethylene terephthalate) (II) [25038-59-9] and 10 parts I had O index 31.0, compared with 23.6 for II alone.
IT **64155-92-6 64155-93-7**
(fireproofing agents, for polymers, manuf. of)
RN 64155-92-6 HCAPLUS

CN Phosphonic dichloride, phenyl-, polymer with 1,3-benzenediol and 2,2'-[sulfonylbis[(2,6-dibromo-4,1-phenylene)oxy]]bis[ethanol] (9CI) (CA INDEX NAME)

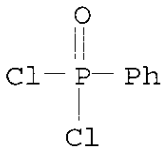
CM 1

CRN 53714-39-9
CMF C16 H14 Br4 O6 S



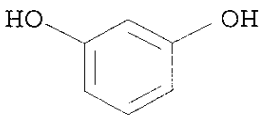
CM 2

CRN 824-72-6
CMF C6 H5 Cl2 O P



CM 3

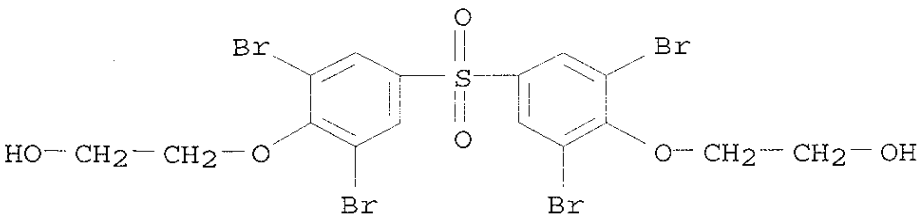
CRN 108-46-3
CMF C6 H6 O2



RN 64155-93-7 HCAPLUS
CN Phosphonic dichloride, propyl-, polymer with 1,4-benzenediol and 2,2'-[sulfonylbis[(2,6-dibromo-4,1-phenylene)oxy]]bis[ethanol] (9CI) (CA INDEX NAME)

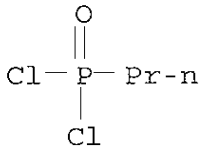
CM 1

CRN 53714-39-9
CMF C16 H14 Br4 O6 S



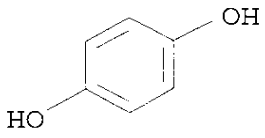
CM 2

CRN 4708-04-7
CMF C3 H7 Cl2 O P



CM 3

CRN 123-31-9
CMF C6 H6 O2



IC C08G079-04
CC 36-3 (Plastics Manufacture and Processing)
ST **polyphosphonate** brominated fireproofing agent; polyester fireproofing agent; polyamide fireproofing agent
IT Polyamides, uses and miscellaneous
(fireproofing agents for, **polyphosphonate** as)
IT Fireproofing agents
(**polyphosphonates**, for polyesters or polyamides)

IT 24937-16-4 25038-59-9, uses and miscellaneous
(fireproofing agents for, **polyphosphonate** as)
IT 64155-88-0 64155-89-1 64155-90-4 64155-91-5 **64155-92-6**
64155-93-7 64155-94-8 64155-95-9
(fireproofing agents, for polymers, manuf. of)

=> d l63 1-31 cbib abs hitstr hitind

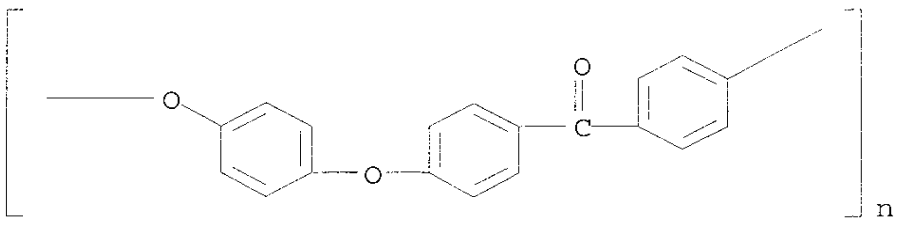
L63 ANSWER 1 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:797076 Ion exchange composite material based on proton conductive silica particles dispersed in a polymer matrix. St.-Arnaud, Marc; Bebin, Philippe (Sim Composites Inc., Can.). PCT Int. Appl. WO 2003083985 A2 20031009, 18 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2003-CA435 20030326. PRIORITY: US 2002-PV367771 20020328.

AB The composite material comprises acid functionalized silica dispersed in a polymer matrix that is based on poly(arom. ether ketones), or poly(benzoyl phenylene), or derivs. thereof. The composite material is characterized by good water retention capabilities due to the acidic functions and the hydrophilicity of the silica particles. Moreover, a good impermeability to gas and liq. fuels commonly used in fuel cell technol., like hydrogen gas or methanol soln., is also obtained due to the presence of silica particles. Good mech. properties of the composite material let the material to be formed easily in thin film or membrane form. In that form, the composite material is usable for proton exchange membrane for fuel cells, for drying or humidifying membrane for gas or solvent conditioning, or as acid catalytic membrane.

IT **31694-16-3D**, Peek, sulfonated
(ion exchange composite material based on proton conductive silica particles dispersed in polymer matrix)

RN 31694-16-3 HCAPLUS

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



IC ICM H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72
IT 7631-86-9D, Silica, acid functionalized **31694-16-3D**, Peek, sulfonated 150385-13-0, Poly(benzoyl-1,4-phenylene)
(ion exchange composite material based on proton conductive silica particles dispersed in polymer matrix)
IT 13598-36-2, **Phosphonic** acid
(silica particles functionalized with; ion exchange composite material based on proton conductive silica particles dispersed in polymer matrix)

L63 ANSWER 2 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:778142 An innovative method for the preparation of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors. Alberti, Giulio; Casciola, Mario; Pica, Monica (Fuma-Tech G.m.b.H., Germany). PCT Int. Appl. WO 2003081691 A2 20031002, 31 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2003-EP2904 20030320. PRIORITY: IT 2002-PG15 20020322.
AB The invention is based on the prepn. of an org. soln. of preferably **phosphonic** acids and tetravalent metals salts, preferably of Zr, Ti, Sn and Ce, in org. solvents, which behaves as a soln. of layered tetravalent metals salts, preferably phosphate-**phosphonates**, which are completely insol. in the known solvents. This peculiarity allows an easy insertion of particles of the above compds. in the pores of porous **membranes**, in the matrixes of those polymers, which are sol. in the same org. solvents, as well as in the **membrane**/electrode interfaces of **fuel cells**. The use of tetravalent metals salts, preferably zirconium phosphate-**phosphonates**, possessing high **proton cond.** (in some cases higher than 10-1 S cm-1) allows the prepn. of impregnated porous

membranes and of nano-polymeric **membranes** combining good mech. properties, and/or reduced permeability to gaseous species, with good **proton cond.** These **membranes** can therefore be employed in **fuel cells** even at temps. higher than 80.degree.. These **membranes** also possess a high catalytic activity and can therefore be employed in catalytic **membrane** reactors.

IC ICM H01M

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 47

ST **fuel cell** use conducting nanopolymeric **membrane** prepn; catalytic **membrane** reactor use conducting nanopolymeric **membrane** prepn; zirconium phosphate **phosphonate** conducting nanopolymeric **membrane**

IT Pore
(dimension; innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT Polyoxyalkylenes
(fluorine- and sulfo-contg., ionomers; innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT Ceramic **membranes**
Solid state **fuel cells**
(innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT Chlorides
Fluoro rubber
Metal alkoxides
Phosphates
Polyesters
(innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT Reactors
(**membrane**, catalytic; innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT Sulfonic acids
(perfluorosulfonic acid polymers; innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT Polyketones
Polysulfones

(**polyether**-, sulfonated; innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT **Polysulfones**
(**polyether**-; innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT Polyethers
(polyketone-, sulfonated; innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT Fluoropolymers
(polyoxyalkylene-, sulfo-contg., ionomers; innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-contg.; innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT **Polyethers**
(**polysulfone**-, sulfonated; innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT **Polyethers**
(**polysulfone**-; innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT Carboxylic acids
(salts; innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT Fluoropolymers
(sulfo-contg., perfluoro; innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT 60-35-5, Acetamide 67-68-5, Dmso 68-12-2, Dmf 75-05-8, Acetonitrile 123-91-1, Dioxan 872-50-4, n-Methyl-2-pyrrolidone 7440-31-5D, Tin, salts 7440-32-6D, Titanium, salts 7440-45-1D, Cerium, salts 7440-67-7D, Zirconium, salts 7699-43-6, Zirconyl chloride 9002-84-0, Ptfe 15477-76-6, **phosphonate** 24937-79-9, Pvdf 25710-96-7, Zirconium propionate 93615-63-5, nafion 1100
(innovative method for prepn. of **proton**

conducting nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT 13772-29-7DP, solid soln. with zirconium phosphate and **phosphonate** contg. org. diacids 116405-42-6P 131249-73-5DP, solid soln. with zirconium phosphate and **phosphonate** contg. org. diacids 608103-65-7DP, solid soln. with zirconium phosphate and **phosphonate** contg. org. diacids 608103-65-7P
(innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT 24937-79-9D, Polyvinylidene fluoride, sulfonated
(innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

IT 67-56-1, Methanol 1333-74-0, Hydrogen
(innovative method for prepn. of **proton conducting** nanopolymeric **membranes** for use in **fuel cells** or in catalytic **membrane** reactors)

L63 ANSWER 3 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN

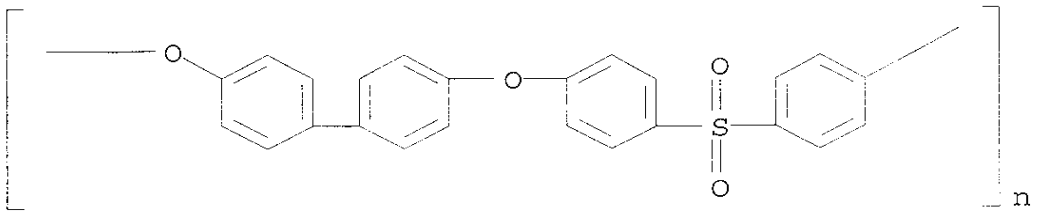
2003:757148 Document No. 139:262063 Aromatic polymer, manufacture and use as fuel cell separator. Yoshimura, Ken; Yashiro, Arihiro; Nodono, Mitsunori (Sumitomo Chemical Company, Limited, Japan). U.S. Pat. Appl. Publ. US 2003180596 A1 20030925, 20 pp. (English). CODEN: USXXCO. APPLICATION: US 2003-395299 20030325. PRIORITY: JP 2002-82967 20020325; JP 2002-195594 20020704.

AB A polymer electrolyte shows excellent characteristics as proton conductive membrane of fuel cells and the like. This polymer electrolyte contains an arom. polymer characterized by having a super strong acid group in a side chain. The 2-methoxy-1,4-dihydroxybenzene/4,4'-difluorodiphenylsulfone copolymer was modified with potassium pentafluorobenzenesulfonate, and as a membrane had proton cond. 4.4 .times. 10-2 S/cm.

IT **25839-81-0DP, brominated**, reaction products with potassium iodooctafluorooxapentanesulfonate
(acid group-modified arom. polyether polysulfone membrane fuel cell separator)

RN 25839-81-0 HCAPLUS

CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



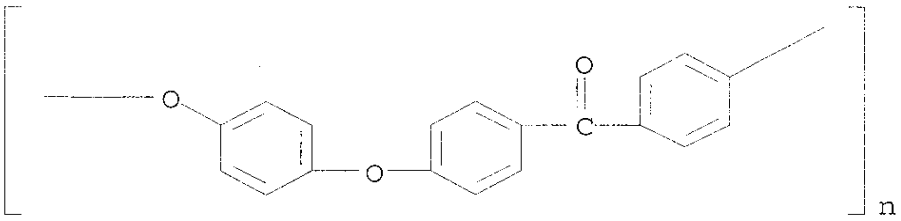
IC ICM H01M008-10
ICS C08J005-22
NCL 429033000; 521027000; 528106000
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 35, 52
IT 882-96-2DP, reaction products with polyether polysulfone
25839-81-0DP, **brominated**, reaction products with potassium iodooctafluorooxapentanesulfonate 105198-11-6DP, reaction products with polyether polysulfone 603951-66-2DP, reaction products with potassium pentafluorobenzenesulfonate 603951-66-2P
(acid group-modified arom. polyether polysulfone membrane fuel cell separator)

L63 ANSWER 4 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:738051 Document No. 139:246732 Ion conducting composite **membrane** materials containing an optionally modified zirconium phosphate dispersed in a polymeric matrix, preparation of **membrane** material, and use. Bauer, Bernd; Roziere, Jacques; Jones, Deborah; Alberti, Giulio; Casciola, Mario; Pica, Monica (Fuma-Tech G.m.b.H., Germany). PCT Int. Appl. WO 2003077340 A2 20030918, 31 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2003-EP2550 20030312. PRIORITY: IT 2002-PG13 20020313.

AB A polymer is uniformly filled with a Zr phosphate, preferably .alpha.-Zr phosphate or Zr phosphate **sulfoarylenphosphonate** particles. The composite **membrane** materials are preferably prepd. starting from a soln. of a polymer and from a colloidal dispersion of .alpha.-Zr phosphate or a Zr phosphate **sulfoarylenphosphonate**, and by removing the solvent by evapn. or by a suitable nonsolvent. The colloidal particles are transferred into the soln. of the polymer preferably by mixing the dispersion with the soln. or by phase transfer. The ionomeric **membranes** with high overall performance in high temp., esp.

H, are used in indirect MeOH **fuel cells** and with decreased MeOH crossover in direct MeOH **fuel cells**

IT **31694-16-3D**, Victrex PEEK, sulfonated
(ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
RN 31694-16-3 HCAPLUS
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



IC ICM H01M008-00
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52
ST zirconium phosphate ionomer **membrane proton conducting fuel cell**
IT **Fuel cells**
(MeOH; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
IT Polysulfones, uses
(arom., sulfonated; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
IT **Membranes**, nonbiological
(composite, **proton conducting**; ion **conducting** composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
IT Polyoxyalkylenes, uses
(fluorine- and sulfo-contg., ionomers; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
IT Polyketones
(polyether-, phthalazinone group-contg.; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
IT Polyketones
Polysulfones, uses
(**polyether-**, sulfonated; ion conducting composite **membrane** materials contg. an optionally modified

zirconium phosphate dispersed in a polymeric matrix)
IT Polyethers, uses
(polyketone-, phthalazinone group-contg.; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
IT Polyethers, uses
(polyketone-, sulfonated; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
IT Fluoropolymers, uses
(polyoxyalkylene-, sulfo-contg., ionomers; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-contg.; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
IT **Polyethers**, uses
(**polysulfone**-, sulfonated; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
IT Fluoropolymers, uses
Polybenzimidazoles
(sulfonated; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
IT 107-10-8D, Propylamine, intercalation compd. with zirconium phosphate 13772-29-7D, intercalation compd. with propylamine 13772-29-7D, solid solns. with zirconium **sulfophenylphosphonate** 24937-79-9D, Polyvinylidene fluoride, sulfonated **31694-16-3D**, Victrex PEEK, sulfonated 127833-97-0D, solid solns. with zirconium phosphate
(ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)

L63 ANSWER 5 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:628405 Document No. 139:166954 **Proton-conductive** polymer **membrane** and its use in **fuel cell**. Kuromatsu, Hidehisa; Minamimura, Kiyoyuki (Kanegafuchi Chemical Industry Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003229143 A2 20030815, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-29044 20020206.
AB The **membrane** contains polymers having SO3H-contg. arom. rings and has P content 0.001-5%. The **membrane** has high **proton cond.** and oxidn. resistance and is useful for an electrolyte in a solid polymer **fuel cell**.
IC ICM H01M008-02
ICS C08J005-22; C08K003-32; C08L043-02; C08L081-04; C08L101-02; H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 76

ST **fuel cell** electrolyte **proton conductive** polymer **membrane**

IT **Polysulfones**, uses
(**polyether**-, arom., sulfonated; **proton-conductive** sulfo-contg. arom. ring polymer **membrane** for **fuel cell** electrolyte with high oxidn. resistance)

IT **Polyethers**, uses
(**polysulfone**-, arom., sulfonated; **proton-conductive** sulfo-contg. arom. ring polymer **membrane** for **fuel cell** electrolyte with high oxidn. resistance)

IT **Fuel cell** electrolytes
(**proton-conductive** sulfo-contg. arom. ring polymer **membrane** for **fuel cell** electrolyte with high oxidn. resistance)

IT Ionic **conductors**
(**protonic**; **proton-conductive** sulfo-contg. arom. ring polymer **membrane** for **fuel cell** electrolyte with high oxidn. resistance)

IT Polythiophenylenes
(sulfonated; **proton-conductive** sulfo-contg. arom. ring polymer **membrane** for **fuel cell** electrolyte with high oxidn. resistance)

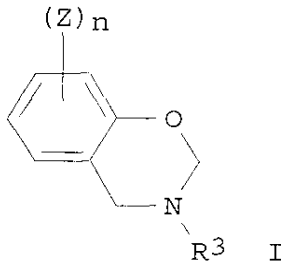
IT 9016-75-5DP, Poly(phenylene sulfide), sulfonated
(Torelina; **proton-conductive** sulfo-contg. arom. ring polymer **membrane** for **fuel cell** electrolyte with high oxidn. resistance)

IT 1343-93-7 27754-99-0, Poly(**vinylphosphonic** acid)
(**membrane** contg.; **proton-conductive** sulfo-contg. arom. ring polymer **membrane** for **fuel cell** electrolyte with high oxidn. resistance)

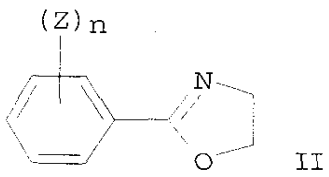
IT 25667-42-9DP, sulfonated
(**proton-conductive** sulfo-contg. arom. ring polymer **membrane** for **fuel cell** electrolyte with high oxidn. resistance)

L63 ANSWER 6 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:586587 Document No. 139:152288 Thermally crosslinkable polymer solid electrolyte for **fuel cell**, polymer solid electrolyte film, and manufacture thereof. Kitamura, Kota; Takase, Satoshi; Sakaguchi, Yoshimitsu; Nagahara, Shigenori; Hamamoto, Shiro; Nakao, Junko (Toyobo Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003217343 A2 20030731, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-15987 20020124.

GI



I



II

AB The thermally crosslinkable polymer solid electrolyte has .gtoreq.1 ionic group and .gtoreq.1 thermally crosslinkable group in the mol. The ionic group may be sulfonic acid or **phosphonic** acid group. Thermally crosslinkable group may be -C6H4(Z)n-C.tplbond.R1, -C6H4(Z)n-OCH2-C.tplbond.R2, I -C6H4(Z)n-CR6=CR4R5, CH2-CR9=CR8R7, or II (Z = mH, C12-10 hydrocarbon, halo, etc.; R1-9 = H, C1-10 alkyl, Ph, etc.; X = H, monovalent metal ion; and n = integer 1-4). The polymer backbone chain may be polyethersulfone or polyether ketone.

IC ICM H01B001-06
ICS C08G065-40; C08G075-23; C08J005-22; H01B013-00; H01M008-02; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35, 38

ST thermally crosslinkable polymer solid electrolyte **fuel cell**

IT Polyketones
Polysulfones, uses
(**polyether**-; thermally crosslinkable polymer solid electrolyte for **fuel cell**)

IT Polyethers, uses
(polyketone-; thermally crosslinkable polymer solid electrolyte for **fuel cell**)

IT **Polyethers**, uses
(**polysulfone**-; thermally crosslinkable polymer solid electrolyte for **fuel cell**)

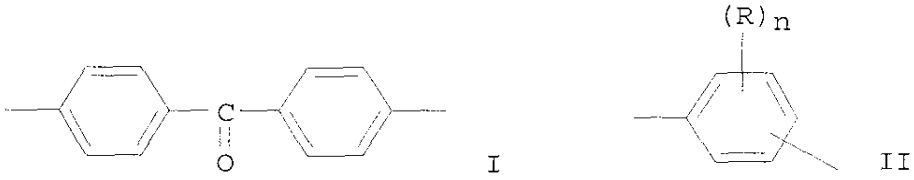
IT **Fuel cell** electrolytes
Fuel cells
(thermally crosslinkable polymer solid electrolyte for **fuel cell**)

IT 569346-21-0DP, Disodium 4,4'-dichlorodiphenylsulfone-3,3'-disulfonate-4,4'-dichlorodiphenylsulfone-biphenol copolymer, reaction product with 4-ethynylphenol
(crosslinked; thermally crosslinkable polymer solid electrolyte for **fuel cell**)

L63 ANSWER 7 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:586586 Document No. 139:124155 Photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film, photocrosslinking polymer solid electrolyte film, and manufacture

thereof,. Kitamura, Kota; Takase, Satoshi; Sakaguchi, Yoshimitsu; Nagahara, Shigenori; Hamamoto, Shiro; Nakao, Junko (Toyobo Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003217342 A2 20030731, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-15986 20020124.

GI



AB The photocrosslinking polymer solid electrolyte contains .gtoreq.1 ionic group and .gtoreq.1 photocrosslinkable group om the mol. The ionic group may be sulfonic acid or **phosphonic** acid. The photocrosslinkable group may be represented by I and II (R = C1-10 aliph. hydrocarbon; and n = integer 1-4). The polymer backbone chain may be polyethersulfone or polyether ketone. The photocrosslinking polymer solid electrolyte exhibited not only excellent ionic cond. but also showed swelling resistance.

IC ICM H01B001-06
ICS C08G065-40; C08G075-23; H01B013-00; H01M008-02; H01M008-10

CC 72-2 (Electrochemistry)
Section cross-reference(s): 35, 38

ST photocrosslinkable polymer solid electrolyte **fuel cell** proton exchange film; polyethersulfone polyether ketone polymer solid electrolyte

IT **Fuel cells**
Polymer electrolytes
(photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)

IT Polyketones
Polysulfones, uses
(**polyether**-; photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)

IT Polyethers, uses
(polyketone-; photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)

IT **Polyethers**, uses
(**polysulfone**-; photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)

IT 565221-52-5P
(photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)

L63 ANSWER 8 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:550271 Document No. 139:119897 Polymer electrolyte composition and proton-conductive membrane for fuel cell. Okaniwa, Motoki; Goto, Kohei (JSR Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003201403 A2 20030718, 21 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-2793 20020109.

AB The compn. contains a polymer electrolyte and an antioxidant contg. (a) .gtoreq.1 compd. selected from a phenolic OH-contg. compd. and an amine and (b) an org. P or org. S compd. except the phenols or amines. The proton-conductive membrane is that made of the compn. showing enhancement of resistance to oxidn. by H2O2 radical (generated in fuel cells) without affecting proton cond. and mech. strength.

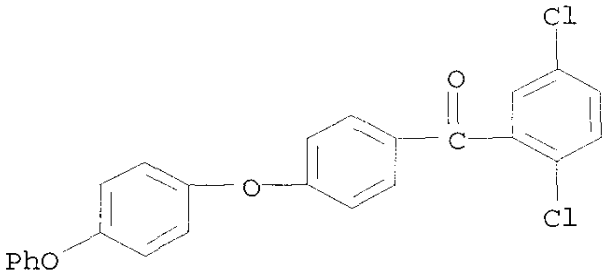
IT **463963-71-5DP**, sulfonated
(polymer electrolyte compn. contg. antioxidant for proton-conductive membrane in fuel cell)

RN 463963-71-5 HCAPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

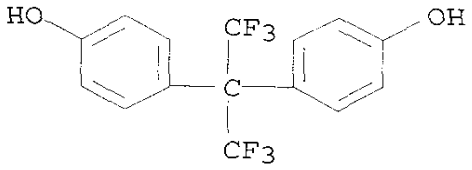
CM 1

CRN 463954-50-9
CMF C25 H16 Cl2 O3



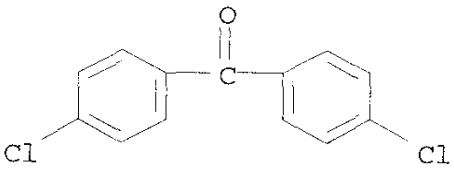
CM 2

CRN 1478-61-1
CMF C15 H10 F6 O2

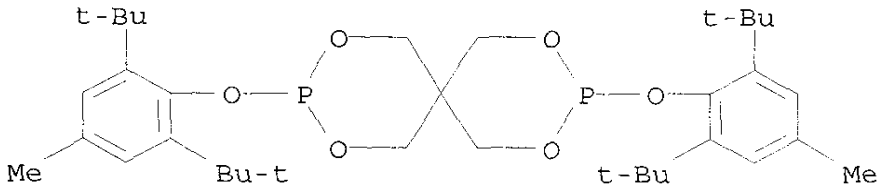


CM 3

CRN 90-98-2
CMF C13 H8 Cl2 O



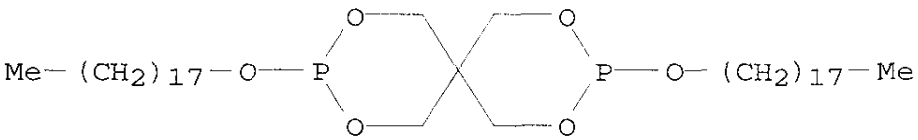
IT **80693-00-1**, Bis[2,6-di(tert-butyl)-4-methylphenyl)pentaerythritol **diphosphite**
(polymer electrolyte compn. contg. antioxidant for proton-conductive membrane in fuel cell)
RN 80693-00-1 HCAPLUS
CN 2,4,8,10-Tetraoxa-3,9-diphosphaspiro[5.5]undecane, 3,9-bis[2,6-bis(1,1-dimethylethyl)-4-methylphenoxy]- (9CI) (CA INDEX NAME)



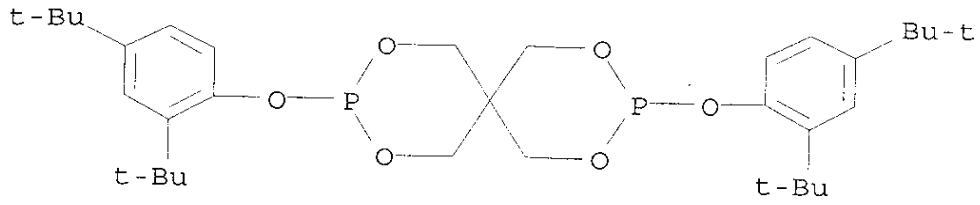
IC ICM C08L101-00
ICS C08G065-12; C08K005-13; C08K005-17; C08K005-36; C08K005-49; C08L071-00; C25B013-08; H01M008-02; H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
IT 364062-39-5DP, 4,4'-Dichlorobenzophenone-2,5-Dichloro-4'-phenoxybenzophenone copolymer, sulfonated **463963-71-5DP**, sulfonated
(polymer electrolyte compn. contg. antioxidant for

proton-conductive membrane in fuel cell)
IT 693-36-7, Distearyl-3,3'-thiodipropionate 1455-42-1D, 3,9-Bis(2-hydroxy-1,1-dimethylethyl)-2,4,8,10-tetraoxaspiro[5.5]undecane, ester mixt. 1703-58-8D, 1,2,3,4-Butanetetracarboxylic acid, ester mixt. 1709-70-2, 1,3,5-Trimethyl-2,4,6-tris[3,5-di(tert-butyl)-4-hydroxybenzyl)benzene 2403-89-6D, 1,2,2,6,6-Pentamethyl-4-piperidinol, ester mixt. 6683-19-8, Pentaerythrityl tetrakis[3-[3,5-di(tert-butyl)-4-hydroxyphenyl]propionate] 27676-62-6, Tris[3,5-di(tert-butyl)-4-hydroxybenzyl] isocyanurate 29598-76-3 **80693-00-1**, Bis[2,6-di(tert-butyl)-4-methylphenyl)pentaerythritol **diphosphite** 561307-00-4
(polymer electrolyte compn. contg. antioxidant for proton-conductive membrane in fuel cell)

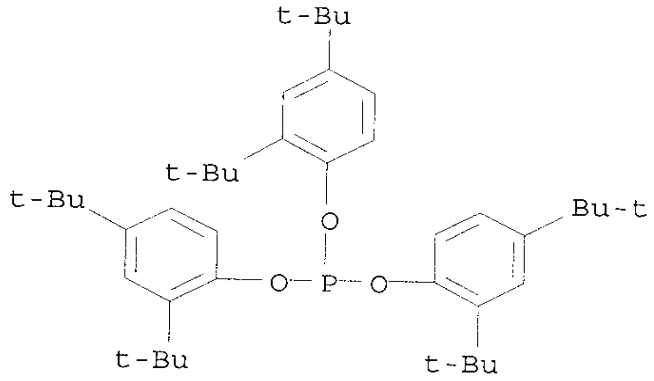
L63 ANSWER 9 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:173096 Document No. 138:207828 Polymer electrolyte composition and fuel cell. Hidaka, Yasuaki; Iwasaki, Katsuhiko (Sumitomo Chemical Company, Limited, Japan). Eur. Pat. Appl. EP 1289041 A2 20030305, 23 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK. (English). CODEN: EPXXDW. APPLICATION: EP 2002-17695 20020807. PRIORITY: JP 2001-241897 20010809; JP 2001-261127 20010830.
AB A polymer electrolyte compn. comprising a polymer electrolyte and at least one of antioxidant selected from a group which consists of an antioxidant contg. trivalent phosphorous and a sulfur-contg. antioxidant is provided as a polymer electrolyte compn. superior in radical resistance property.
IT **3806-34-6**, ADK Stab PEP-8 **26741-53-7**, Ultranox 626 **31570-04-4**, Sumilizer P-16 **80693-00-1** **140221-14-3**
(antioxidant; polymer electrolyte compn. and fuel cell)
RN 3806-34-6 HCAPLUS
CN 2,4,8,10-Tetraoxa-3,9-diphosphaspiro[5.5]undecane, 3,9-bis(octadecyloxy)- (9CI) (CA INDEX NAME)



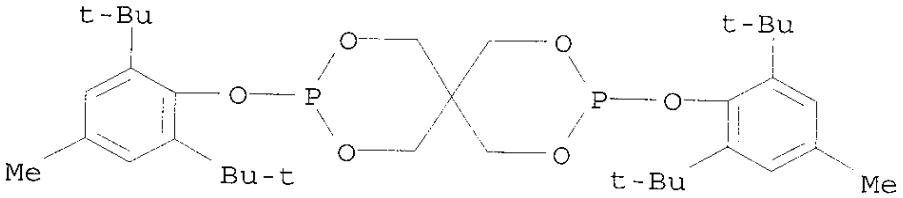
RN 26741-53-7 HCAPLUS
CN 2,4,8,10-Tetraoxa-3,9-diphosphaspiro[5.5]undecane, 3,9-bis[2,4-bis(1,1-dimethylethyl)phenoxy]- (9CI) (CA INDEX NAME)



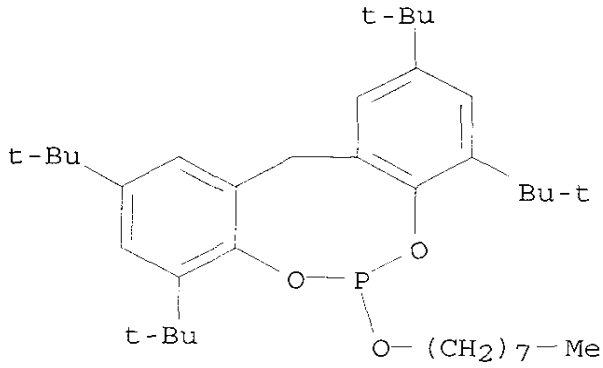
RN 31570-04-4 HCAPLUS
CN Phenol, 2,4-bis(1,1-dimethylethyl)-, phosphite (3:1) (9CI) (CA INDEX NAME)



RN 80693-00-1 HCAPLUS
CN 2,4,8,10-Tetraoxa-3,9-diphosphaspiro[5.5]undecane, 3,9-bis[2,6-bis(1,1-dimethylethyl)-4-methylphenoxy]- (9CI) (CA INDEX NAME)



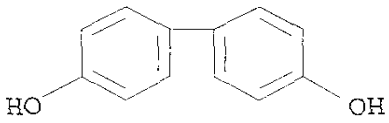
RN 140221-14-3 HCAPLUS
CN 12H-Dibenzo[d,g][1,3,2]dioxaphosphocin, 2,4,8,10-tetrakis(1,1-dimethylethyl)-6-(octyloxy)- (9CI) (CA INDEX NAME)



IT **83094-08-0DP**, 4,4'-Dichlorodiphenyl sulfone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenyl sulfone copolymer, sulfonated
(polymer electrolyte compn. and fuel cell)
RN 83094-08-0 HCAPLUS
CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

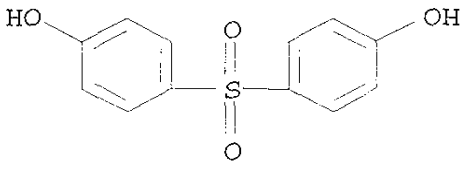
CM 1

CRN 92-88-6
CMF C12 H10 O2



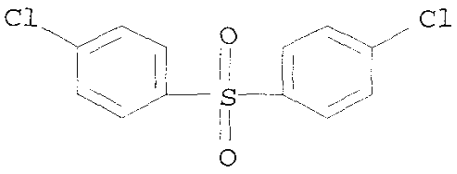
CM 2

CRN 80-09-1
CMF C12 H10 O4 S



CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



IC ICM H01M008-10
ICS C08K005-00
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
IT 85-60-9, SUMILIZER BBM-S 96-69-5, SUMILIZER WX-R 123-28-4, SUMILIZER TPL-R 693-36-7, SUMILIZER TPS **3806-34-6**, ADK Stab PEP-8 16545-54-3, SUMILIZER TPM **26741-53-7**, Ultranox 626 29598-76-3, SUMILIZER TP-D **31570-04-4**, Sumilizer P-16 **80693-00-1 140221-14-3** 147192-62-9, GSYP-101 153550-59-5, Sandostab P-EPQ 203255-81-6, Sumilizer GP
(antioxidant; polymer electrolyte compn. and fuel cell)
IT 90-43-7DP, [1,1'-Biphenyl]-2-ol, polymer contg., reaction product with hydroxy-terminated polyether sulfone and 4,4'-difluorobenzophenone, sulfonated 92-88-6DP, [1,1'-Biphenyl]-4,4'-diol, polymer contg., reaction product with hydroxy-terminated polyether sulfone and 4,4'-difluorobenzophenone, sulfonated 345-92-6DP, polymer contg., reaction product with hydroxy-terminated polyether sulfone and 4,4'-difluorobenzophenone, sulfonated 25667-42-9DP, Sumikaexcel PES 5003P, polymer contg., reaction product with hydroxy-terminated polyether sulfone and 4,4'-difluorobenzophenone, sulfonated **83094-08-0DP**, 4,4'-Dichlorodiphenyl sulfone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenyl sulfone copolymer, sulfonated
(polymer electrolyte compn. and fuel cell)

L63 ANSWER 10 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2002:650050 Document No. 137:170014 **Bromination** of aromatic polyethers for high yield at mild condition. Sasaki, Shigeru (Sumitomo Chemical Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2002241493 A2 20020828, 4 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 2001-38116 20010215. foreign Application
AB The polymers shown as [(C6H4ZC6H4O)x(ArO)y (Z = SO2, CO; x, y = 0.01-0.99; x + y = 1; Ar = (heteroelement-contg.) divalent arom. C4-18 group] in org. solvents are **brominated** with N-bromosuccinimide in the presence of strong acids. Thus, (p-C6H4SO2-p-C6H4O)0.85(p-C6H4C6H4-p-O)0.15 was reacted with N-bromosuccinimide in CH2Cl2 in the presence of H2SO4 and further

processed to give a **brominated** polymer.

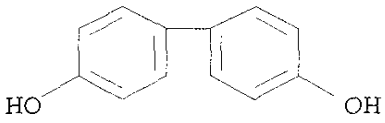
IT **83094-08-0DP**, 4,4'-Biphenol-4,4'-dichlorodiphenyl sulfone-4,4'-dihydroxydiphenyl sulfone copolymer, **brominated** (**bromination** of arom. polyethers with bromosuccinimide for high yield at mild condition)

RN 83094-08-0 HCAPLUS

CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

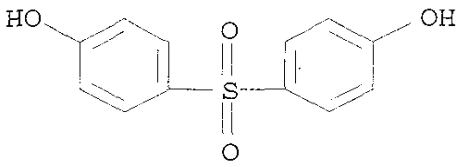
CM 1

CRN 92-88-6
CMF C12 H10 O2



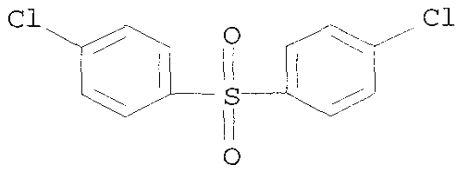
CM 2

CRN 80-09-1
CMF C12 H10 O4 S



CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



IC ICM C08G065-48

CC 35-8 (Chemistry of Synthetic High Polymers)
ST arom polyether polysulfone **bromination** bromosuccinimide
IT **Bromination**
(**bromination** of arom. polyethers with bromosuccinimide for high yield at mild condition)
IT Polysulfones, preparation
(polyether-, arom., **brominated; bromination** of arom. polyethers with bromosuccinimide for high yield at mild condition)
IT Polyethers, preparation
(polysulfone-, arom., **brominated; bromination** of arom. polyethers with bromosuccinimide for high yield at mild condition)
IT 7664-93-9, Sulfuric acid, uses
(**bromination** of arom. polyethers with bromosuccinimide for high yield at mild condition)
IT 128-08-5DP, N-Bromosuccinimide, reaction products with polyether-polysulfones 25608-63-3DP, **brominated** 25667-42-9DP, **brominated** **83094-08-0DP**, 4,4'-Biphenol-4,4'-dichlorodiphenyl sulfone-4,4'-dihydroxydiphenyl sulfone copolymer, **brominated**
(**bromination** of arom. polyethers with bromosuccinimide for high yield at mild condition)
IT 75-09-2, Methylene chloride, uses
(solvent; **bromination** of arom. polyethers with bromosuccinimide for high yield at mild condition)

L63 ANSWER 11 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2002:392080 Document No. 136:387796 Isoelectric gateways and method and apparatus for using same.. Vigh, Gyula (USA). U.S. Pat. Appl. Publ. US 2002060154 A1 20020523, 13 pp. (English). CODEN: USXXCO. APPLICATION: US 2001-990549 20011121. PRIORITY: AU 2000-1614 20001122.
AB This invention is directed to isoelec. gateways for use in the alteration of the compn. of the sample wherein the buffering capacity of such isoelec. gateways is not as limited as in an isoelec. **membrane** and the isoelec. gateways are suitably used in anal. and preparative-scale isoelec. focusing sepns., or in the alteration of the compn. of solns. that contain at least one amphoteric substance. The isoelec. gateway is comprised of a first ion-permeable barrier; a second ion-permeable barrier at a predetd. distance apart from the first ion-permeable barrier so as to define a space therebetween; and an isoelec. substance disposed between the first and second ion-permeable barriers, wherein the isoelec. substance has a characteristic pI value and a good buffering capacity and adequate cond. around its characteristic pI value, and wherein the ion-permeable barriers substantially prevent convective mixing between the contents of the isoelec. gateway and its environment.
IC ICM G01N027-26
ICS G01N027-447
NCL 204459000

CC 47-2 (Apparatus and Plant Equipment)
Section cross-reference(s): 9, 63, 76, 80
ST isoelec gateway app; sepn isoelec focusing app; preparative isoelec focusing sepn app; **membrane** isoelec sepn app; analysis isoelec focusing sep
IT Gels
Membranes, nonbiological
(isoelec. or non-ionic, ion-permeable barriers; isoelec. gateways and method and app. for using same)
IT Filter paper
Paper
(**membrane** supports; isoelec. gateways and method and app. for using same)
IT Acrylic polymers, uses
Polysulfones, uses
(**membranes**; isoelec. gateways and method and app. for using same)
IT **Polysulfones**, uses
(**polyether-**, **membranes**; isoelec. gateways and method and app. for using same)
IT Screens (mesh)
(polymeric, **membrane** supports; isoelec. gateways and method and app. for using same)
IT **Polyethers**, uses
(**polysulfone-**, **membranes**; isoelec. gateways and method and app. for using same)
IT 9003-05-8, Polyacrylamide
(cross-linked, **membranes**; isoelec. gateways and method and app. for using same)
IT 2817-45-0D, Amino **phosphonic** acid, derivs.
(isoelec. substance; isoelec. gateways and method and app. for using same)
IT 9004-34-6D, Cellulose, esters
(**membranes**; isoelec. gateways and method and app. for using same)
IT 9002-18-0, Agar
(supported **membranes** contg.; isoelec. gateways and method and app. for using same)

L63 ANSWER 12 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2001:713743 Document No. 135:259849 Method of fabrication of membrane/electrode composite for fuel cell. Charnock, Peter; Wilson, Brian (Victrex Manufacturing Limited, UK). PCT Int. Appl. WO 2001071835 A2 20010927, 51 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO

2001-GB1244 20010321. PRIORITY: GB 2000-6878 20000322; GB 2000-31211 20001221.

AB A method of manufg. a membrane/electrode composite of a type which includes a catalyst material on a first material which comprises a first conductive polymer includes a step of contacting the first material comprising the first conductive polymer with a polar protic solvent (e.g. sulfuric acid, a sulfonic acid, hydrofluoric acid or phosphoric acid) and causing catalyst material to deposit on the first material. The composite may be used in an electrochem. device, for example a fuel cell.

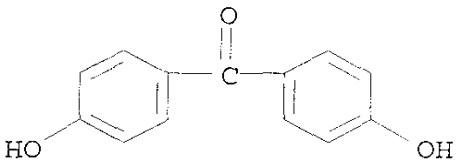
IT **128324-23-2DP**, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxybenzophenone copolymer, sulfonated
128324-24-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer, sulfonated
(method of fabrication of membrane/electrode composite for fuel cell)

RN 128324-23-2 HCAPLUS

CN Methanone, bis(4-fluorophenyl)-, polymer with [1,1'-biphenyl]-4,4'-diol and bis(4-hydroxyphenyl)methanone (9CI) (CA INDEX NAME)

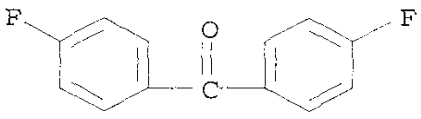
CM 1

CRN 611-99-4
CMF C13 H10 O3



CM 2

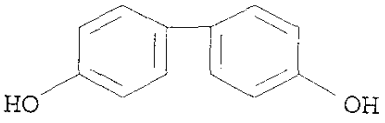
CRN 345-92-6
CMF C13 H8 F2 O



CM 3

CRN 92-88-6

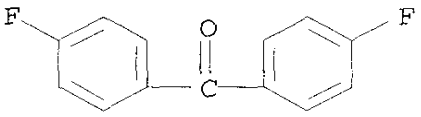
CMF C12 H10 O2



RN 128324-24-3 HCAPLUS
CN Methanone, bis(4-fluorophenyl)-, polymer with [1,1'-biphenyl]-4,4'-diol and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

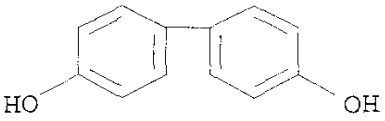
CM 1

CRN 345-92-6
CMF C13 H8 F2 O



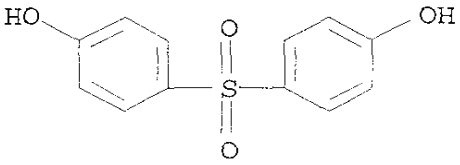
CM 2

CRN 92-88-6
CMF C12 H10 O2



CM 3

CRN 80-09-1
CMF C12 H10 O4 S



IC ICM H01M008-02
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
IT **128324-23-2DP**, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxybenzophenone copolymer, sulfonated
128324-24-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer, sulfonated
(method of fabrication of membrane/electrode composite for fuel cell)
IT 7664-38-2, Phosphoric acid, uses 7664-39-3, Hydrofluoric acid, uses 7664-93-9, Sulfuric acid, uses 9003-01-4 26101-52-0, Polyvinyl sulfonic acid 27754-99-0, Polyvinyl **phosphonic** acid 50851-57-5, Polystyrene sulfonic acid 264624-35-3
(method of fabrication of membrane/electrode composite for fuel cell)

L63 ANSWER 13 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2001:670069 Document No. 135:372092 Synthesis and **proton conductivities** of **phosphonic** acid containing poly-(arylene ether)s. Meng, Y. Z.; Tjong, S. C.; Hay, A. S.; Wang, S. J. (Guangzhou Institute of Chemistry, Chinese Academy of Sciences, Canton, 510650, Peop. Rep. China). Journal of Polymer Science, Part A: Polymer Chemistry, 39(19), 3218-3226 (English) 2001. CODEN: JPACEC. ISSN: 0887-624X. Publisher: John Wiley & Sons, Inc..
AB A novel **phosphonic** acid contg. bisphenol was successfully synthesized from phenolphthalein and m-**aminophenylphosphonic** acid. A series of homo- and copoly(arylene ether)s contg. **phosphonic** acid groups were prepd. by soln. nucleophilic polycondensation. These **phosphonic** acid-contg. polymers can readily be dissolved in common org. solvents, such as DMSO, N-methyl-2-pyrrolidinone, and N-cyclohexylpyrrolidinone, and can be cast into tough and smooth films. The presence of **phosphonic** acid pendants in the poly(arylene ether)s was confirmed by NMR, matrix-assisted laser desorption/ionization time-of-flight mass spectrometry, and cond. measurements. These poly(arylene ether)s had very high glass transition temps. ranging from 254.degree. to >315.degree. and high mol. wts. The conductivities of the synthesized polymers were analyzed by the Cole-Cole method, and they ranged from 10-5 to 10-6 S cm-1. The synthesized polymers also exhibited good soln. processability.
CC 35-5 (Chemistry of Synthetic High Polymers)
ST polyether arom **phosphonic** acid contg; polyarylene ether **phosphonic** acid contg; ionic cond **phosphonic** acid contg polyether
IT Polymerization
(of **phosphonic** acid-contg. bisphenol with bis(fluorophenyl) sulfone)
IT Absorption
(of water; by **phosphonic** acid-contg. arom. polyethers)

IT **Polysulfones**, preparation
(**polyether**-, **phosphonic** acid group-contg.; synthesis and **proton conductivities** of **phosphonic** acid-contg. arom. polyethers)
IT **Polyethers**, preparation
(**polysulfone**-, **phosphonic** acid group-contg.; synthesis and **proton conductivities** of **phosphonic** acid-contg. arom. polyethers)
IT Ionic **conductivity**
(**proton**; synthesis and **proton conductivities** of **phosphonic** acid-contg. arom. polyethers)
IT 7732-18-5, Water, processes
(absorption; of **phosphonic** acid-contg. arom. polyethers)
IT 81-90-3P, Phenolphthalin 142717-68-8P 294212-76-3P
(intermediate; in synthesis of **phosphonic** acid-contg. bisphenol for prepn. of arom. polyethers)
IT 374594-34-0
(monomer; for prepn. of **phosphonic** acid-contg. arom. polyethers)
IT 77-09-8, Phenolphthalein
(reactant; in synthesis of **phosphonic** acid-contg. bisphenol for prepn. of arom. polyethers)
IT 5427-30-5P, 3-**Aminophenylphosphonic** acid
(reactant; in synthesis of **phosphonic** acid-contg. bisphenol for prepn. of arom. polyethers)
IT 374594-35-1P, Bisphenol A-bis(4-fluorophenyl) sulfone-[3-[4,9-bis(4-hydroxyphenyl)-1,3-dioxo-1,3-dihydrobenzo[f]isoindol-2-yl]phenyl] **phosphonic** acid copolymer 374594-36-2P 374594-37-3P
(synthesis and **proton conductivities** of **phosphonic** acid-contg. arom. polyethers)

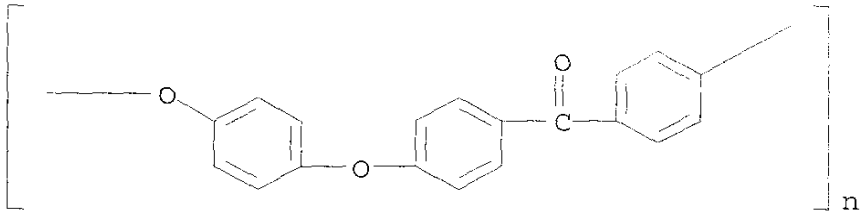
L63 ANSWER 14 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2001:472016 Document No. 135:62388 Solid polymer electrolyte having high-durability. Suzuki, Takahisa; Taniguchi, Takumi; Morimoto, Yu; Kawasumi, Masaya; Hasegawa, Naoki; Kamiya, Atsushi (Kabushiki Kaisha Toyota Chuo Kenkyusho, Japan). Eur. Pat. Appl. EP 1110992 A1 20010627, 37 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2000-126079 20001129. PRIORITY: JP 1999-337015 19991129.
AB In solid polymer electrolyte having high-durability, comprising a polymer electrolyte material having a hydrocarbon part, a chelate group and an electrolyte group are introduced into the polymer electrolyte material. The chelate group contains a **phosphonic** acid group, nitrogen, both of nitrogen and a **phosphonic** acid group (one or more selected from the group consisting of alkylamino **monophosphonic** acid groups, alkylamino **diphosphonic** acid groups, dialkylamino **monophosphonic** acid groups, alkylalkylene diamine **triphosphonic** acid groups, and alkylimino **phosphonic**

acid groups) or, both of nitrogen and a carboxylic acid group (one or more selected from the group consisting of alkylamino monocarboxylic acid groups, alkylamino dicarboxylic acid groups, dialkylamino monocarboxylic acid groups, alkylalkylene diamine tricarboxylic acid groups, and alkylimino carboxylic acid groups).

IT **31694-16-3DP**, PEEK, **phosphonated**
(solid polymer electrolyte having high-durability)

RN 31694-16-3 HCAPLUS

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



IC ICM C08J005-22
ICS H01M008-10; H01M008-02; C08J005-20

CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52

ST polyelectrolyte **membrane fuel cell**; ethylene styrene tetrafluoroethylene graft copolymer polyelectrolyte; chelating group polyelectrolyte

IT **Polysulfones**, uses
(**polyether-**, **phosphonated**; solid polymer electrolyte having high-durability)

IT **Polysulfones**, uses
(**polyether-**, sulfonated; solid polymer electrolyte having high-durability)

IT **Polyethers**, uses
(**polysulfone-**, **phosphonated**; solid polymer electrolyte having high-durability)

IT **Polyethers**, uses
(**polysulfone-**, sulfonated; solid polymer electrolyte having high-durability)

IT **Fuel cells**
Membranes, nonbiological
Polyelectrolytes
(solid polymer electrolyte having high-durability)

IT **31694-16-3DP**, PEEK, **phosphonated**
31694-16-3DP, PEEK, sulfonated 197895-58-2DP, Ethylene-styrene-tetrafluoroethylene graft copolymer, **diethylphosphonated** 197895-58-2DP, Ethylene-styrene-tetrafluoroethylene graft copolymer, sulfonated
(solid polymer electrolyte having high-durability)

IT 27754-99-0, Poly(**vinylphosphonic** acid)

(solid polymer electrolyte having high-durability)

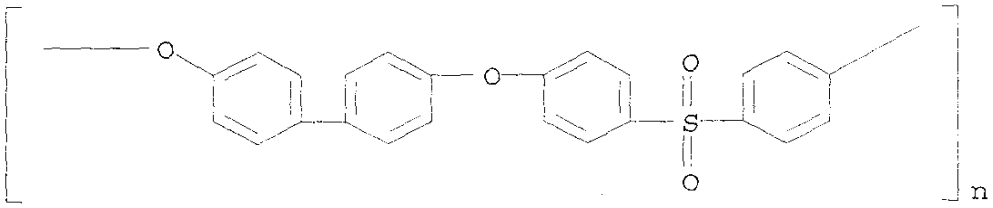
L63 ANSWER 15 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2001:456059 Document No. 135:181075 Modified polysulfones. IV. Synthesis and characterization of polymers with silicon substituents for a comparative study of gas-transport properties. Guiver, Michael D.; Robertson, Gilles P.; Rowe, Sheri; Foley, Stephen; Kang, Yong Soo; Park, Hyun Chae; Won, Jongok; Le Thi, Hoai Nam (Institute for Chemical Process and Environmental Technology, National Research Council of Canada, Ottawa, ON, K1A 0R6, Can.). Journal of Polymer Science, Part A: Polymer Chemistry, 39(13), 2103-2124 (English) 2001. CODEN: JPACEC. ISSN: 0887-624X. Publisher: John Wiley & Sons, Inc..

AB We previously conducted a detailed study of gas-transport and other properties of a series of silicon derivs. of Udel polysulfone (PSf) and Radel polyphenylsulfone; we now report the details of their prepn. by the reaction of lithiated polymer intermediates with chlorosilylalkylaryl electrophiles. Ortho-sulfone-substituted polymers with pendant trimethylsilyl, dimethylphenylsilyl, and diphenylmethylsilyl and other groups were obtained by direct metalation followed by the reaction of the dilithiated intermediate with the appropriate silyl electrophile. In addn., the structural regularity and geometry of the dilithiated site was also exploited to introduce silicon into the main chain by the reaction of dichlorosilyl electrophiles, leading to the formation of a new tricyclic heteroatom ring. Ortho-ether PSf derivs. were obtained from a dibrominated polymer via the lithiation of **brominated** polymer and reaction with a silyl electrophile. The degree of substitution of the silyl groups was 2.0 or less from dilithiated polymers and was dependent on the electrophile reactivity and reaction conditions. A detailed structural characterization of the polymers by NMR and IR spectroscopy is reported in addn. to glass-transition temps. and thermal stabilities.

IT **25839-81-0D**, Radel R 5000, trialkylsilyl-contg.
(modified polysulfones with silicon substituents)

RN 25839-81-0 HCAPLUS

CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



CC 35-8 (Chemistry of Synthetic High Polymers)

IT **25839-81-0D**, Radel R 5000, trialkylsilyl-contg.
(modified polysulfones with silicon substituents)

L63 ANSWER 16 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2001:38911 Document No. 135:46847 Dielectric properties of polysulfone Udel P-1700 containing **phosphonic** groups. Ziaja, Jan; Balogh, Laszlo; Trochimczuk, Witold M. (Inst. Podstaw Elektrotech. i Elektrotechnol., Politech. Wroclawska, Wroclaw, 50-377, Pol.). Prace Naukowe Instytutu Podstaw Elektrotechniki i Elektrotechnologii Politechniki Wroclawskiej, 34, 153-156 (Polish) 1998. CODEN: PNIPA3. ISSN: 0370-0852. Publisher: Oficyna Wydawnicza Politechniki Wroclawskiej.

AB **Polyether-polysulfone** UDEL P-1700 (PSU) modified by chlorophosphorylation, hydrolysis, and oxidn. to obtain **phosphonic** groups (PSU-PO(OH)2) was subjected to dielec. properties measurements. PSU has been recently applied in **membrane** process because of its high glass temp. The addnl. advantage of the PSU and its derivs. application in the **membrane** process is that they do not need to be crosslinked. Measurements were carried out on the phosphorylated PSU (substitution rate 0.26, 0.56 and 0.97) in the form of porous **membranes** 0.08-0.18mm thick. The effect of the substitution degree on dielec. properties of phosphorylated PSU was detd.

CC 37-5 (Plastics Manufacture and Processing)
Section cross-reference(s): 38, 76

ST **polyether polysulfone phosphonic** group **membrane** dielec property

IT Dielectric constant
Dielectric loss
Electric resistance
Membranes, nonbiological
(dielec. properties of **polyether-polysulfone** contg. **phosphonic** groups)

IT Polymer morphology
(morphol. and dielec. properties of **polyether-polysulfone** contg. **phosphonic** groups)

IT **Polysulfones**, properties
(**polyether**-; dielec. properties of **polyether-polysulfone** contg. **phosphonic** groups)

IT **Polyethers**, properties
(**polysulfone**-; dielec. properties of **polyether-polysulfone** contg. **phosphonic** groups)

IT 25135-51-7D, Udel P 1700, **phosphonic** group-contg.
(dielec. properties of **polyether-polysulfone** contg. **phosphonic** groups)

L63 ANSWER 17 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2000:260778 Document No. 132:294808 Composite solid polymer electrolyte **membranes**. Formato, Richard M.; Kovar, Robert F.; Osenar, Paul; Landrau, Nelson; Rubin, Leslie S. (Foster-Miller, Inc., USA). PCT Int. Appl. WO 2000022684 A2 20000420, 95 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK,

MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1999-US19476 19990826. PRIORITY: WO 1998-US17898 19980828; US 1999-261349 19990303.

AB The present invention relates to composite solid polymer electrolyte **membranes** (SPEMs) which include a porous polymer substrate (typically a liq. crystal polymer) interpenetrated with an ion-conducting material (typically a perfluorinated ionomer). SPEMs of the present invention are useful in electrochem. applications, including **fuel cells** and electrodialysis.

IC ICM H01M

CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52

ST composite solid polymer electrolyte **membrane**; **fuel cell** polymer electrolyte **membrane**; electrodialysis polymer electrolyte **membrane**; liq crystal polymer interpenetrating network electrolyte; perfluorinated ionomer interpenetrating network electrolyte

IT Pervaporation
(app.; composite solid polymer electrolyte **membranes**)

IT Polyamides, uses
Polyketones
(arom.; composite solid polymer electrolyte **membranes**)

IT Dialyzers
Electrolytic cells
Interpenetrating polymer networks
Liquid crystals, polymeric
Primary batteries
(composite solid polymer electrolyte **membranes**)

IT Polybenzimidazoles
Polybenzothiazoles
Polybenzoxazoles
Polyimides, uses
Polyoxyphenylenes
Polyphenyls
Polysulfones, uses
Polythiophenylenes
(composite solid polymer electrolyte **membranes**)

IT **Fuel cells**
(direct methanol or hydrogen; composite solid polymer electrolyte **membranes**)

IT Dialyzers
(electrodialyzers; composite solid polymer electrolyte **membranes**)

IT Polyimides, uses
Polyimides, uses
(fluorine-contg.; composite solid polymer electrolyte **membranes**)

IT Ionomers
(fluoropolymers; composite solid polymer electrolyte

membranes)
IT Fluoropolymers, uses
(ionomers; composite solid polymer electrolyte **membranes**
)
IT Polymer electrolytes
(**membrane**; composite solid polymer electrolyte
membranes)
IT Polyimides, uses
Polyimides, uses
Polyketones
Polyketones
Polysulfones, uses
Polysulfones, uses
(**polyether**-; composite solid polymer electrolyte
membranes)
IT Fluoropolymers, uses
Fluoropolymers, uses
(polyimide-; composite solid polymer electrolyte
membranes)
IT Polyethers, uses
Polyethers, uses
(polyimide-; composite solid polymer electrolyte
membranes)
IT Polyethers, uses
Polyethers, uses
(polyketone-; composite solid polymer electrolyte
membranes)
IT Polyquinoxalines
(polyphenylquinoxalines; composite solid polymer electrolyte
membranes)
IT Polysulfones, uses
Polysulfones, uses
(polysulfide-, arom.; composite solid polymer electrolyte
membranes)
IT Polysulfides
Polysulfides
(polysulfone-, arom.; composite solid polymer electrolyte
membranes)
IT **Polyethers**, uses
Polyethers, uses
(**polysulfone**-; composite solid polymer electrolyte
membranes)
IT **Membranes**, nonbiological
(solid polymer electrolyte; composite solid polymer electrolyte
membranes)
IT Plastics, uses
(thermoplastics; composite solid polymer electrolyte
membranes)
IT Plastics, uses
(thermosetting; composite solid polymer electrolyte
membranes)
IT 25667-42-9DP, sulfonated

(Ultrason; composite solid polymer electrolyte **membranes**
)
IT 25135-51-7DP, Udel, sulfonated 25212-74-2DP, PPS, sulfonated
63496-24-2P, Nafion EW1100 154281-38-6DP, Radel R, sulfonated
220998-11-8P, 4,4'-(Hexafluoroisopropylidene)bis(phthalic
anhydride-m-Phenylenediamine-sodium 2,4-diaminobenzenesulfonate
copolymer
(composite solid polymer electrolyte **membranes**)
IT 88-63-1P, 2,4-Diaminobenzenesulfonic acid 3177-22-8P, Sodium
2,4-diaminobenzenesulfonate
(composite solid polymer electrolyte **membranes**)
IT 9003-01-4, Polyacrylic acid 24938-64-5 24938-67-8,
Poly[oxy(2,6-dimethyl-1,4-phenylene)] 24938-68-9,
2,6-Diphenylphenol homopolymer, sru 25035-37-4,
p-Phenylenediamine-terephthalic acid copolymer 25134-01-4,
2,6-Dimethylphenol homopolymer 26101-52-0, Polyvinyl sulfonic acid
26353-84-4, 2,6-Diphenylphenol homopolymer 27754-99-0, Polyvinyl
phosphonic acid 50851-57-5, Polystyrene sulfonic acid
264624-35-3, Trifluorostyrenesulfonic acid homopolymer
(composite solid polymer electrolyte **membranes**)

L63 ANSWER 18 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2000:32556 Document No. 132:86775 High durability solid polymer
electrolyte. Taniguchi, Takumi; Kawakado, Masaya; Morimoto, Tomo
(Toyota Central Research and Development Laboratories, Inc., Japan).
Jpn. Kokai Tokkyo Koho JP 2000011756 A2 20000114, 8 pp.
(Japanese). CODEN: JKXXAF. APPLICATION: JP 1998-174352 19980622.
AB The electrolyte has a mixt. of a polymer having electrolytic groups
and hydrocarbon parts and a P-contg. compd. The electrolyte shows
high durability and excellent resistance to oxidn.
IC ICM H01B001-12
ICS C08L101-02; H01M008-02
CC 76-10 (Electric Phenomena)
Section cross-reference(s): 38
IT Polyketones
Polyketones
Polysulfones, uses
Polysulfones, uses
(**polyether-**, **phosphonated**; solid polymer
electrolyte contg. P-contg. compd.)
IT **Polyethers**, uses
Polyethers, uses
(**polysulfone-**, **phosphonated**; solid polymer
electrolyte contg. P-contg. compd.)

L63 ANSWER 19 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1999:107066 Document No. 130:169310 Manufacture of polyethersulfone
films with good yellowing prevention. Kanemitsu, Akiyoshi (Sumitomo
Chemical Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 11035705 A2
19990209 Heisei, 3 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP
1997-199941 19970725.
AB Title films, useful for optical films, are manufd. by casting

polyethersulfones (PES) solns. contg. hypophosphonic acid and/or phosphonic acid on substrates, drying the solns. to form films, and peeling the films off the substrates. Thus, a Cl2CH2 soln. contg. PES composed of 82.4 mol% C6H4SO2C6H4O and 17.6 mol% C6H4SO2C6H4OC6H4C6H4O and 100 ppm (on PES) hypophosphonic acid was cast on glass and dried to give a film showing total light transmittance 89.7%, haze 0.4%, and yellowness index 0.92.

IC ICM C08J005-18
ICS B29C041-12; B29C041-24; C08K003-32; C08L081-06; B29K071-00; B29L007-00

CC 38-3 (Plastics Fabrication and Uses)

IT **Polysulfones**, uses
Polysulfones, uses
(**polyether**-; manuf. of polyethersulfone films contg. **hypophosphonic** acid and/or **phosphonic** acid for yellowing prevention)

IT **Polyethers**, uses
Polyethers, uses
(**polysulfone**-; manuf. of polyethersulfone films contg. **hypophosphonic** acid and/or **phosphonic** acid for yellowing prevention)

L63 ANSWER 20 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1999:64727 Document No. 130:112338 **Membrane** and method for synthesis of hydrogen peroxide. McIntyre, James A.; Sanders, Edgar S., Jr.; Mahoney, Robert D.; Webb, Steven P.; Murchison, Craig B.; Hayes, David A. (The Dow Chemical Company, USA). PCT Int. Appl. WO 9902264 A1 19990121, 37 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1998-US12156 19980610. PRIORITY: US 1997-52299 19970711.

AB A **membrane** useful for the manuf. of hydrogen peroxide from hydrogen and oxygen has a hydrogen contact side and an oxygen contact side and comprises a porous hydrophobic catalyst layer facing the oxygen contact side and a gas flux control layer facing the hydrogen contact side. A gas flux control layer is positioned between the hydrogen contact side and the porous hydrophobic catalyst layer such that the flux of hydrogen may be controllably delivered to the porous hydrophobic catalyst layer. The gas flux control layer is typically a macroporous hydrophobic org. polymeric material selected from polycarbonates, polyesters, polyester carbonates, polysulfones, polyolefins, polyphenylene oxides, polyethers, polyimides, polystyrene, polyether imides, polyamide imides, or polyether sulfones. In addn., a catalyst erosion control layer is positioned on the surface of the porous hydrophobic catalyst layer. The catalyst is an oxygen-reducing catalyst selected from Pt, Pd, Rh, Re, In, Au, Ag, Cu, Co, Fe, Ni, Pb, Zn,

Ga, Sn, and Bi, on a carrier. The **membrane** and method may be used to synthesize hydrogen peroxide directly from hydrogen and oxygen without the use of org. solvents or complex equipment for ionic and elec. transport.

IC ICM B01J035-06
ICS B01J031-06; C01B015-029

CC 49-8 (Industrial Inorganic Chemicals)
Section cross-reference(s): 38

ST hydrogen peroxide manuf catalyst **membrane**; oxygen reducing catalyst **membrane** hydrogen peroxide; polycarbonate **membrane** hydrogen peroxide manuf; hydrophobization **membrane** hydrogen peroxide manuf

IT Copying paper
(carbon paper, porous; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT Heteropoly acids
Zeolites (synthetic), uses
(catalyst support; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT Fluoropolymers, uses
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT Polycarbonates, uses
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT Polyesters, uses
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT Polyethers, uses
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT Polyimides, uses
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT Polyolefins
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT Polyoxyphenylenes
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT Polysulfones, uses
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from

hydrogen and oxygen)
IT **Membranes**, nonbiological
(hydrophobic; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
IT Fluoropolymers, reactions
(hydrophobization agent; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
IT Silanes
(hydrophobization agents; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
IT Hydrophobicity
(hydrophobization; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
IT Catalysts
(**membrane**; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
IT Fluorides, reactions
(org., hydrophobization agent; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
IT **Membranes**, nonbiological
(permselective; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
IT Polyimides, uses
Polyimides, uses
(polyamide-, gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
IT Polyesters, uses
Polyesters, uses
(polycarbonate-, gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
IT Polycarbonates, uses
Polycarbonates, uses
(polyester-, gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
IT Polyimides, uses
Polyimides, uses
Polysulfones, uses
Polysulfones, uses
(**polyether**-, gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
IT Polyamides, uses

Polyamides, uses
Polyethers, uses
Polyethers, uses
(polyimide-, gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT Ion exchangers
Reduction catalysts
(polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT **Polyethers**, uses
Polyethers, uses
(**polysulfone**-, gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT 1306-38-3, Cerium oxide, uses 1312-81-8, Lanthanum oxide 1314-23-4, Zirconia, uses 1344-28-1, Alumina, uses 7440-44-0, Carbon, uses 7631-86-9, Silica, uses 7664-38-2D, Phosphoric acid, alk. earth salts, uses 7664-93-9D, Sulfuric acid, alk. earth salts, uses 11129-18-3, Cerium oxide 12653-89-3, Vanadium silicate 13463-67-7, Titania, uses 42613-21-8, Titanium silicate
(catalyst support; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT 7439-89-6, Iron, uses 7439-92-1, Lead, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6, Rhodium, uses 7440-22-4, Silver, uses 7440-31-5, Tin, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-55-3, Gallium, uses 7440-57-5, Gold, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 7440-74-6, Indium, uses
(catalysts; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT 9002-88-4 9003-07-0 9010-79-1, Ethylene-propylene copolymer
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT 9003-53-6 9003-70-7, Styrene-divinylbenzene copolymer
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT 1429-50-1, Ethylenediamine tetra(**methylenephosphonic** acid) 2466-09-3, Pyrophosphoric acid 2809-21-4, 1-Hydroxyethylidene-1,1-**diphosphonic** acid 6419-19-8, Aminotri(**methylenephosphonic** acid)
(hydrogen peroxide stabilizers; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

IT 7782-41-4, Fluorine, reactions 9002-84-0, PTFE
(hydrophobization agent; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from

hydrogen and oxygen)
IT 27815-51-6, Tetrabromobisphenol A polycarbonate
(**membrane**; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
IT 7722-84-1P, Hydrogen peroxide (H2O2), preparation
(polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
IT 1333-74-0, Hydrogen, reactions 7782-44-7, Oxygen, reactions
(polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
IT 64-18-6, Formic acid, uses 64-19-7, Acetic acid, uses 74-90-8, Hydrogen cyanide, uses 144-62-7, Ethanedioic acid, uses 7647-01-0, Hydrochloric acid, uses 7664-38-2, Phosphoric acid, uses 7664-93-9, Sulfuric acid, uses 7697-37-2, Nitric acid, uses 10034-85-2, Hydrogen iodide 10035-10-6, Hydrogen bromide, uses
(promoter; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)

L63 ANSWER 21 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1996:545590 Document No. 125:196767 Manufacture of organophosphorus oligomers as fireproofing agents for fibers. Kubota, Michio; Kondo, Yoshikazu; Saito, Hajime; Makino, Kimihiro (Kanebo Ltd, Japan; Nikka Chemical Ind Co Ltd). Jpn. Kokai Tokkyo Koho JP 08151392 A2 19960611 Heisei, 11 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1995-61669 19950224. PRIORITY: JP 1994-261556 19940930.
AB Title oligomers with acid value <10 are manufd. by condensation of XP(:O)L2 (X = C1-8 alkyl, C6-18 aryl; C7-20 aralkyl, C6-14 satd. alicyclyl; L = halo) with H(OCHRCH2)lOAO(CH2CHRO)mH (A = halogen-free divalent arom. group; R = H, C1-4 alkyl; l, m = 1, 2), followed by hydrolysis and addn. of the resulting oligomeric HO[P(:O)(X)(OCHRCH2)lOAO(CH2CHRO)m]nH (A, R, X, l, m = same as above) with epoxy compds. The oligomers do not discolor fibers, do not generate toxic gas when burned, and show good dyeability. Thus, condensation of Me2C(C6H4OCH2CH2OH-4)2 with PhPOCl2, hydrolysis, and addn. with 1,2-epoxybutane gave all-4-EtCH(OH)CH2O[P(:O)(Ph)OCH2CH2OCMe2OCH2CH2O]nH (mol. wt. 6000).
IC ICM C07F009-38
ICS C08G079-04; D01F006-76; D01F006-84
ICA C09K021-12
CC 35-5 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 40
IT **Polysulfones**, preparation
(**polyphosphonate-polyether**; manuf. of fireproofing organophosphorus oligomers with low acid value for fibers)

L63 ANSWER 22 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1996:294808 Document No. 124:319377 Porous composite **membrane** and process. Moya, Wilson (Millipore Corporation, USA). PCT Int. Appl. WO 9603202 A1 19960208, 23 pp. DESIGNATED STATES: W: CN, JP, KR, RU; RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL,

PT, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1995-US10080 19950725. PRIORITY: US 1994-281882 19940728.

AB The **membrane** comprises a porous **membrane** substrate having an av. pore size of 0.01-10 .mu. formed of a 1st polymer which is coated over its entire surface with a crosslinked 2nd polymer. The 2nd polymer is dissolved in a solvent with a free radical polymn. initiator in the absence of a crosslinking agent. The 2nd polymer is crosslinked in situ and rendered insol. by mild heating and/or exposure to UV light.

IC ICM B01D069-12

CC 38-3 (Plastics Fabrication and Uses)

ST polyvinylidene fluoride porous composite **membrane**; polyethylene porous composite **membrane**; ultrafiltration hydrophilic composite **membrane**; polypropylene porous composite **membrane**; hollow fiber composite **membrane**

IT **Membranes**
(porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)

IT Polyamides, uses
Polypropene fibers, uses
(porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)

IT Fluoropolymers
Polysulfones, uses
(porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)

IT Polyolefin fibers
(ethylene, porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)

IT Textiles
(nonwoven, porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)

IT **Polysulfones**, uses
(**polyether**-, porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)

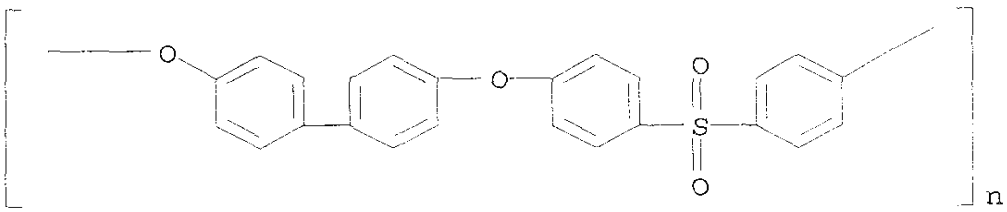
IT **Polyethers**, uses
(**polysulfone**-, porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)

IT Alkenes, uses
(.alpha.-, polymers, porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)

IT 9002-84-0, Polytetrafluoroethylene 9002-88-4, Polyethylene 9002-89-5, Polyvinyl alcohol 9003-01-4, Polyacrylic acid 9003-07-0, Polypropylene 9003-39-8, Poly(vinyl pyrrolidone) 24937-79-9, Polyvinylidene fluoride 26336-38-9, Poly(vinyl amine) 27754-99-0, Poly(vinyl **phosphonic** acid) 29499-22-7, Vinyl alcohol-vinyl amine copolymer 51729-06-7, Diallyldimethylammonium chloride-vinyl alcohol copolymer
(porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)

IT 9002-86-2, PVC
(porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)
IT 9003-05-8, Polyacrylamide 25087-26-7, Polymethacrylic acid
(porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)

L63 ANSWER 23 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1996:35018 Document No. 124:147236 Process for producing azide-substituted aromatic polysulfones. Guiver, Michael D.; Robertson, Gilles P. (National Research Council of Canada, Can.). U.S. US 5475065 A 19951212, 30 pp. (English). CODEN: USXXAM. APPLICATION: US 1994-292959 19940822. PRIORITY: GB 1993-17617 19930824.
AB The title process involves attaching azide groups onto the arom. rings of polysulfones by first activating the attachment site by direct lithiation or **bromination**, followed by lithiation. The lithiated intermediates are converted substantially quant. to azides by reacting with a suitable azide, preferably tosyl azide, under substantially anhyd. conditions. Novel azide-substituted polysulfones contg. from one to about three azide groups per repeat polymer unit were obtained, the degree of azide substitution being detd. by the degree of lithiation. The azides may also be converted to other functional derivs. such as primary amines and crosslinked membranes.
IT **25839-81-0DP**, Radel R5000, reaction products with azides
(process for producing azide-substituted arom. polysulfones)
RN 25839-81-0 HCAPLUS
CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



IC ICM C08G075-23
ICS C08L081-06
NCL 525535000
CC 35-8 (Chemistry of Synthetic High Polymers)
IT 110-65-6DP, 2-Butyne-1,4 diol, reaction products with polysulfone azides 142-45-0DP, Acetylene dicarboxylic acid, reaction products with polysulfone azides 762-42-5DP, Dimethyl acetylenedicarboxylate, reaction products with polysulfone azides 1066-54-2DP, Trimethylsilylacetylene, reaction products with polysulfone azides 25135-51-7DP, Udel P-3500, reaction products with azides **25839-81-0DP**, Radel R5000, reaction products

with azides
(*process for producing azide-substituted arom. polysulfones*)

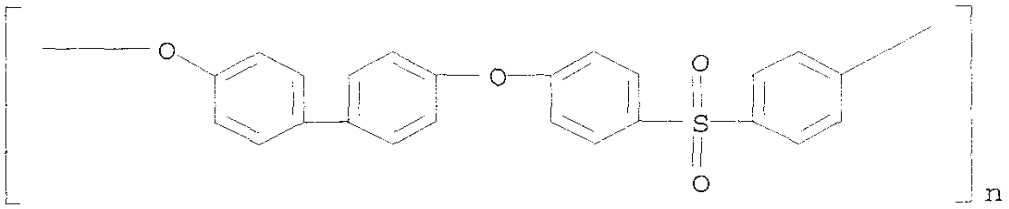
L63 ANSWER 24 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1995:868143 Document No. 123:257736 Chemical Modification of Polysulfones II: An Efficient Method for Introducing Primary Amine Groups onto the Aromatic Chain. Guiver, Michael D.; Robertson, Gilles P.; Foley, Stephen (Institute for Environmental Research and Technology, National Research Council, Ottawa, ON, K1A 0R6, Can.). *Macromolecules*, 28(23), 7612-21 (*English*) 1995. CODEN: MAMOBX. ISSN: 0024-9297. Publisher: American Chemical Society.

AB Three modification approaches to aminated polysulfones were investigated: replacement of arom. bromine with nucleophilic NH2; amination by electrophilic NH2; and amination of lithiated polysulfones via azides and other electrophilic NH2 synthons. The former two approaches resulted in low levels of amination, or in polymer degrdn. For the latter approach using lithiated polysulfones, we report an efficient alternative to the nitration-redn. methodol. for introducing amine groups onto polysulfones and polyaryl sulfones. Polysulfones activated either on the ortho sulfone sites or on the ortho ether sites by direct lithiation or **bromination**-lithiation, were converted to azides by treatment with tosyl azide, and then reduced to amine derivs. with sodium borohydride. This could be accomplished either by a two-step procedure whereby the azide was isolated, or by a "one-pot" modification. Near-quant. conversions and high levels of functionalization were achieved for the overall process. Polymers having an amine degree of substitution (DS) of 1.0, 2.0, and 2.75 are reported. Structures were confirmed by NMR and IR spectroscopy. GPC, TGA, and Tg data are also reported. A nonquant. reaction of diphenylphosphoryl azide as well as 4-acetamidobenzenesulfonyl azide with lithiated polysulfones also gave aminated derivs.

IT **25839-81-0DP**, Radel R5000, aminated
(primary amine group introduction onto polysulfone arom. chain)

RN 25839-81-0 HCAPLUS

CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



CC 35-8 (Chemistry of Synthetic High Polymers)

IT 25135-51-7DP, Udel P3500, aminated 25154-01-2DP, Bisphenol A-4,4'-dichlorodiphenyl sulfone copolymer, aminated 25608-64-4DP, 4,4'-Biphenol-4,4'-dichlorodiphenylsulfone copolymer, aminated

25839-81-0DP, Radel R5000, aminated
(primary amine group introduction onto polysulfone arom. chain)

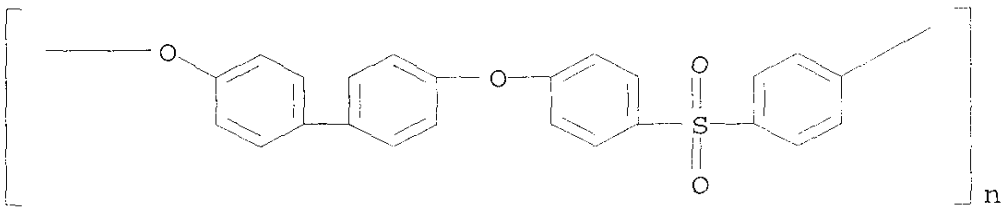
L63 ANSWER 25 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1995:283551 Document No. 122:161633 Chemical Modification of Polysulfones: A Facile Method of Preparing Azide Derivatives from Lithiated Polysulfone Intermediates. Guiver, Michael D.; Robertson, Gilles P. (Institute for Environmental Research and Technology, National Research Council of Canada, Ottawa, ON, K1A 0R6, Can.). Macromolecules, 28(1), 294-301 (English) 1995. CODEN: MAMOBX. ISSN: 0024-9297. Publisher: American Chemical Society.

AB A quant. and regiospecific method for attaching azide groups onto the arom. rings of polysulfone and poly(aryl sulfone) is reported. Polysulfones were activated either on the ortho-sulfone sites or the ortho-ether sites by direct lithiation or **bromination** -lithiation. The lithiated intermediates were converted quant. to azides by treatment with tosyl azide. Polysulfones contg. one, two, and three azide groups per repeat unit were obtained, the degree of substitution being detd. by the degree of lithiation. The structures were confirmed principally by NMR spectroscopy. TGA and GPC data are also reported. Sol. aryl azide modified polysulfones were readily isolated and are esp. useful for facile conversion to primary amines. This conversion as well as the 1,3-dipolar cycloaddns. of these azides will be reported sep.

IT **25839-81-0DP**, Radel R5000, azide derivs.
(two-step prepn. and thermal stability of polyether-polysulfones)

RN 25839-81-0 HCAPLUS

CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



CC 35-8 (Chemistry of Synthetic High Polymers)

IT 941-55-9DP, Tosyl azide, reaction products with polyether-polysulfones 25135-51-7DP, Udel P 3500, azide derivs. **25839-81-0DP**, Radel R5000, azide derivs.
(two-step prepn. and thermal stability of polyether-polysulfones)

L63 ANSWER 26 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1994:139153 Document No. 120:139153 Modified polysulfones as **membrane** electrolytes. Nolte, R.; Ledjeff, K.; Bauer, M.; Muelhaupt, R. (Fraunhofer-Inst. Sol. Energiesyst., Freiburg, 7800, Germany). BHR Group Conference Series Publication, 3(Effective Membrane Processes--New Perspectives), 381-5 (English) 1993. CODEN:

BGCSEL. ISSN: 1470-0557.

AB Com. available polymers, esp. poly(arylene ether sulfones), which are not affected by O, hydrolysis, and temp. change were functionalized by sulfonation and tested as solid polymer electrolytes in electrolyzers and **fuel cells**. To solve the swelling problem, the **membrane** was crosslinked during the casting process using 1,1'-carbonyldiimidazole for activation of sulfonic acid groups and a diamine for the crosslinking. Sulfonated poly(arylene ether sulfone) **membranes** combine good electrochem. properties of the perfluorinated materials with low cost and advanced processability. Since arom. sulfonation is a reversible reaction, and consequently the sulfonic acid groups are not stable at elevated temps., **phosphonic** acid groups were attached to the poly(arylene ether sulfone). Materials with **phosphonic** acid groups showed a significantly higher temp. stability compared to the sulfonated polymers.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72

ST polysulfone modified electrolyte **membrane**; **fuel cell** modified polysulfone electrolyte **membrane**; electrolysis cell modified polysulfone electrolyte **membrane** ; polyarylene ether sulfone sulfonated electrolyte **membrane**

IT Electric resistance
(of sulfonated poly(arylene ether sulfones), for electrolytes in **fuel** and electrolytic **cells**)

IT **Fuel-cell** electrolytes
(poly(arylene ether sulfones) for, sulfonated or phosphorylated)

IT **Membranes**
(sulfonated poly(arylene ether sulfones), as electrolytes for **fuel** and electrolytic **cells**)

IT Amines, compounds
(di-, reaction products, with sulfonated poly(arylene ether sulfones), crosslinked electrolyte **membranes**, for **fuel** and electrolytic **cells**)

IT **Polysulfones**, compounds
(**polyether**-, arom., phosphorylated, electrolyte **membranes**, for **fuel cells** and electrolytic cells)

IT **Polysulfones**, compounds
(**polyether**-, arom., sulfonated, electrolyte **membranes**, for **fuel cells** and electrolytic cells)

IT **Polyethers**, compounds
(**polysulfone**-, arom., phosphorylated, electrolyte **membranes**, for **fuel cells** and electrolytic cells)

IT **Polyethers**, compounds
(**polysulfone**-, arom., sulfonated, electrolyte **membranes**, for **fuel cells** and electrolytic cells)

IT Permeability and Permeation

(selective, of sulfonated poly(arylene ether sulfones), for electrolytes in **fuel** and electrolytic **cells**)

IT 25135-51-7D, Udel P-1700, phosphorylated 25667-42-9D, Victrex PES, sulfonated, crosslinked with diamines
(electrolyte **membranes**, for **fuel cells** and electrolytic cells)

IT 530-62-1, 1,1'-Carbonyldiimidazole
(in sulfonated poly(arylene ether sulfone) crosslinking, for electrolytes in **fuel** and electrolytic **cells**)

L63 ANSWER 27 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN

1993:255448 Document No. 118:255448 Synthesis of aromatic polyphosphonate: low temperature solution polycondensation of 4,4'-sulfonyldiphenol with phenoxy dichlorophosphate. Liaw, Der Jang; Shen, Wen Chang (Dep. Chem. Eng., Natl. Taiwan Inst. Technol., Taipei, 106, Taiwan). Polymer, 34(6), 1336-8 (English) 1993. CODEN: POLMAG. ISSN: 0032-3861.

AB An arom. polyphosphonate is prepd. from the reaction of Ph dichlorophosphate (I) with 4,4'-sulfonyldiphenol (II) in a chlorinated hydrocarbon solvent under low-temp. conditions. The glass transition temp. (Tg) and melt temp. of the copolymer are 69.degree. and 133.degree., resp. The lower Tg value of the I-II copolymer compared to that of phenylphosphonic dichloride-I copolymer may be attributed to the flexible ether linkage. I-II copolymer starts to lose wt. at .apprx.300.degree. under air or N atm. The I-II copolymer has good flame retardancy, as indicated by high limiting O index of 47.0.

CC 35-5 (Chemistry of Synthetic High Polymers)

ST **polyether polysulfone polyphosphonate** arom; sulfonyldiphenol phenyl dichlorophosphate polymn; flame retardant arom **polyphosphonate**; glass temp arom **polyphosphonate**

IT **Polysulfones**, preparation
(**polyether**-, arom., **polyphosphonate**-, prepn. and glass temp. of flame-retardant)

IT **Polyethers**, preparation
(**polysulfone**-, arom., **polyphosphonate**-, prepn. and glass temp. of flame-retardant)

L63 ANSWER 28 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN

1991:20605 Document No. 114:20605 Process and apparatus for removing ammonia from mammalian cell cultures. Van Eikeren, Paul; Radovich, John M. (Bend Research, Inc., USA). Eur. Pat. Appl. EP 385613 A1 19900905, 8 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, FR, GB, IT, LI, NL, SE. (English). CODEN: EPXXDW. APPLICATION: EP 1990-301630 19900215. PRIORITY: US 1989-315477 19890224.

AB A process for removing NH3 formed during the culturing of mammalian cells in a culture medium comprises: (a) contacting the culture medium with 1 side of a 2-sided, supported-fluid **membrane** wherein the **membrane** support is a microporous hydrophobic polymeric matrix; and (b) maintaining a strip soln. which has a pH .ltoreq. 7.0 with the other side of the supported-fluid

membrane. The **membrane** support matrix is hollow fibers (e.g. of polypropylene, polytetrafluoroethylene, polyethersulfone, etc.), beads, or NH3-absorbing material (e.g. cation exchange resin or H+-contg. porous ceramic) coated on beads. A culture medium for baby hamster kidney (BHK) cells was circulated through the lumens of a supported-gas (air) **membrane** in a support contg. Celgard X-20 (polypropylene) hollow fibers potted in a bundle in a module. The shell of the module was filled with 0.5 M H2SO4 (pH 0.3). After 4.5 h the NH3 concn. was reduced from 14 mM to 0.5 mM. The **membrane** removed inhibitory NH3 but did not remove necessary nutrients or metabolites, as cell growth in the treated medium was essentially the same as that of the NH3-free medium. Schematics of the app. are shown.

IC ICM C12M003-00
ICS B01D061-00

CC 9-1 (Biochemical Methods)

ST ammonia removal cell culture medium; hydrophobic polymer microporous **membrane** ammonia removal

IT Alcohols, biological studies
Amines, biological studies
Carboxylic acids, biological studies
(ammonia removal from mammalian cell culture medium by app. contg. supported-fluid hydrophobic **membrane** and strip soln. contg.)

IT Animal tissue culture
(ammonia removal from medium for, by supported-fluid **membrane** in app.)

IT Cation exchangers
(hydrophobic **membrane**-coated, ammonia removal from mammalian cell culture medium by circulation through)

IT Polypropene fibers, biological studies
(microporous hollow fiber **membrane** contg., for ammonia removal from medium for mammalian cell culture)

IT Sulfonic acids, biological studies
(alkane, ammonia removal from mammalian cell culture medium by app. contg. supported-fluid hydrophobic **membrane** and strip soln. contg.)

IT Alcohols, biological studies
(aralkyl, ammonia removal from mammalian cell culture medium by app. contg. supported-fluid hydrophobic **membrane** and strip soln. contg.)

IT Sulfonic acids, biological studies
(arene, ammonia removal from mammalian cell culture medium by app. contg. supported-fluid hydrophobic **membrane** and strip soln. contg.)

IT Amines, biological studies
Carboxylic acids, biological studies
(aryl, ammonia removal from mammalian cell culture medium by app. contg. supported-fluid hydrophobic **membrane** and strip soln. contg.)

IT **Membranes**
(hydrophobic, microporous, polymeric, for ammonia removal from

medium for mammalian cell culture)
IT **Membranes**
(hydrophobic, microporous, hollow-fiber, for ammonia removal from medium for mammalian cell culture)
IT Filters and Filtration apparatus
(**membranes**, supported-fluid, ammonia removal from mammalian cell culture medium by circulation through)
IT **Polysulfones**, biological studies
(**polyether**-, fiber, microporous hollow fiber **membrane** contg., for ammonia removal from medium for mammalian cell culture)
IT Synthetic fibers, polymeric
(**polyether-polysulfones**, microporous hollow fiber **membrane** contg., for ammonia removal from medium for mammalian cell culture)
IT **Polyethers**, biological studies
(**polysulfone**-, fiber, microporous hollow fiber **membrane** contg., for ammonia removal from medium for mammalian cell culture)
IT Synthetic fibers, polymeric
(tetrafluoroethylene, microporous hollow fiber **membrane** contg., for ammonia removal from medium for mammalian cell culture)
IT Synthetic fibers, polymeric
(vinylidene fluoride, microporous hollow fiber **membrane** contg., for ammonia removal from medium for mammalian cell culture)
IT 7664-38-2D, Phosphoric acid, dialkyl esters 13598-36-2D, **Phosphonic** acid, alkyl, dialkyl 13840-40-9D, Phosphine oxide, trialkyl derivs.
(ammonia removal from mammalian cell culture medium by app. contg. supported-fluid hydrophobic **membrane** and strip soln. contg.)
IT 9002-84-0, Polytetrafluoroethylene 24937-79-9, Poly(vinylidenefluoride)
(microporous hollow fiber **membrane** contg., for ammonia removal from medium for mammalian cell culture)
IT 78-50-2, Trioctylphosphine oxide
(poly(vinylidene fluoride) **membrane**-coated Amberlite IRA-118H beads contg., in ammonia removal from baby hamster kidney cell culture medium)
IT 120918-97-0, Amberlite IRA-118H
(poly(vinylidene fluoride) **membrane**-coated and trioctylphosphine oxide-contg., in ammonia removal from baby hamster kidney cell culture medium)
IT 7664-41-7, Ammonia, uses and miscellaneous
(removal of, from medium for mammalian cell culture, by supported-fluid **membrane** in app.)

L63 ANSWER 29 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1989:498651 Document No. 111:98651 Manufacture of aromatic polymeric cation exchangers. Sada, Toshikatsu; Iwamoto, Hisahiko (Tokuyama

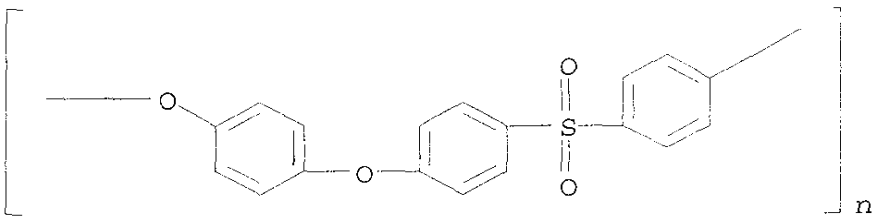
Soda Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 01020237 A2 19890124 Heisei, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1987-174959 19870715.

AB Cation exchangers are prepd. from haloalkyl-contg. arom. condensation polymers, not having imide, amide, or ester groups, which are modified with cation-exchanging groups. A 10% ethylene dichloride soln. (1000 parts) of a polymer having p-OC6H4-p-O-C6H4-p-SO2C6H4 repeating units was treated with 50 parts ClCH2OMe (I) and 18 parts SnCl4 (II), then the resulted elastic polymer was treated with 3 equiv. HSO3Cl, and then a N-methylpyrrolidone soln. of the modified polymer was cast on a glass plate, treated in the air for 10 min, soaked in H2O, and peeled off to give a film, which was conditioned with aq. NaOH and aq. HCl to give a cation exchanger film having break strength 2 kg/cm2 vs. 0.5 for a control film prepd. without treatment by I and II.

IT **28212-68-2D**, haloalkyl-modified, sulfonated or **phosphonated** or carboxylated
(cation exchanger films, with improved strength)

RN 28212-68-2 HCAPLUS

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



IC ICM C08J005-20

CC 38-3 (Plastics Fabrication and Uses)

IT 107-30-2D, Chloromethyl methyl ether, reaction products with sulfonated arom. polymers 623-03-0D, reaction products with haloalkyl-modified arom. polymers 7446-11-9D, Sulfur trioxide, reaction products with haloalkyl-modified arom. polymers 7719-12-2D, Phosphorous trichloride, reaction products with haloalkyl-modified arom. polymers 7790-94-5D, Chlorosulfonic acid, reaction products with haloalkyl-modified arom. polymers 25135-51-7D, haloalkyl-modified, sulfonated or **phosphonated** or carboxylated 25667-40-7D, Poly(p-phenylene oxide), haloalkyl-modified, sulfonated or **phosphonated** or carboxylated **28212-68-2D**, haloalkyl-modified, sulfonated or **phosphonated** or carboxylated
(cation exchanger films, with improved strength)

L63 ANSWER 30 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN

1989:497896 Document No. 111:97896 Functional group polysulfones by

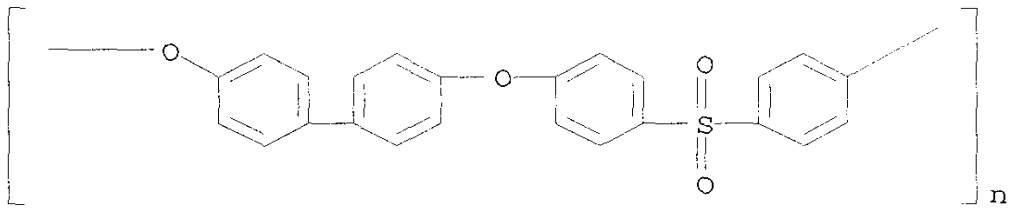
bromination-metalation. Guiver, Michael D.; Kutowy, O.; ApSimon, John W. (Div. Chem., Nat. Res. Counc. Canada, Ottawa, ON, K1A 0R6, Can.). Polymer, 30(6), 1137-42 (English) 1989. CODEN: POLMAG. ISSN: 0032-3861.

AB A variety of functional groups can be substituted on arom. polysulfones by a process of **bromination** followed by metalation. Both Udel polysulfone and Radel poly(Ph sulfone) were **brominated** at room temp. using Br without a catalyst. Repeat units contg. Br atoms at the electrophilic site in the bisphenol portion were obtained when excess reagent was used. These polymers readily undergo metal-halogen exchange with n-BuLi. The resulting polyanionic lithiated polysulfones are reactive to a variety of electrophiles and give contg. functional groups such as carboxyl and hydroxyl. These polymers are useful as membrane materials.

IT **25839-81-0DP**, Radel, functionalized
(prepn. of, via **bromination**-lithiation followed by reaction with electrophiles)

RN 25839-81-0 HCAPLUS

CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



CC 35-8 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 38

ST functionalized arom polysulfone **bromination** lithiation

IT **Bromination** catalysts
(iron, for arom. polysulfones)

IT **Bromination**
(of arom. polysulfones, followed by lithiation and reaction with electrophiles)

IT Lithiation
(of **brominated** arom. polysulfones, followed by reaction with electrophiles)

IT Chains, chemical
(structure of, of functionalized arom. polysulfones prepd. via **bromination**-lithiation followed by reaction with electrophiles)

IT Polysulfones, reactions
(arom., functionalization of, via **bromination** -lithiation followed by reaction with electrophiles)

IT 7726-95-6
(**bromination**, of arom. polysulfones, followed by

lithiation and reaction with electrophiles)
IT 7439-89-6, Iron, uses and miscellaneous
(catalysts, for **bromination** of arom. polysulfones)
IT 25135-51-7, Udel P 3500 25839-81-0, Radel
(functionalization of, via **bromination**-lithiation followed by reaction with electrophiles)
IT 74-88-4DP, Iodomethane, reaction products with lithiated arom. polysulfones 75-77-4DP, Chlorotrimethylsilane, reaction products with lithiated arom. polysulfones 109-72-8DP, n-Butyllithium, reaction products with **brominated** arom. polysulfones 119-61-9DP, Benzophenone, reaction products with lithiated arom. polysulfones 124-38-9DP, Carbon dioxide, reaction products with lithiated arom. polysulfones 624-92-0DP, Dimethyl disulfide, reaction products with lithiated arom. polysulfones
(prepn. and structure of)
IT 25135-51-7DP, Udel P 3500, functionalized **25839-81-0DP**, Radel, functionalized
(prepn. of, via **bromination**-lithiation followed by reaction with electrophiles)

L63 ANSWER 31 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1988:22763 Document No. 108:22763 Synthesis and study of deformation-strength properties of some phosphorus-containing block copolymers. Shaov, A. Kh.; Gurdaliev, Kh. Kh.; Keshtov, M. M. (USSR). Polikondensats. Protsessy i Polimery, Nal'chik 122-30 From: Ref. Zh., Khim. 1987, Abstr. No. 9S669 (Russian) 1986.
AB Title only translated.
CC 37-6 (Plastics Manufacture and Processing)
IT Fireproofing
(of arom. polyester-**polyether-polysulfones**, with **cyclohexylphosphonic** dichloride)
IT **Polysulfones**, properties
(polyester-**polyether**-, arom., block, **cyclohexylphosphonic** dichloride-modified, fire resistance and mech. properties of)
IT **Polyethers**, properties
(polyester-**polysulfone**-, arom., block, **cyclohexylphosphonic** dichloride-modified, fire resistance and mech. properties of)
IT Polyesters, properties
(**polyether-polysulfone**-, arom., block, **cyclohexylphosphonic** dichloride-modified, fire resistance and mech. properties of)
IT 1005-22-7, **Cyclohexylphosphonic** dichloride
(modifier, for arom. polyester-**polyether-polysulfones**, mech. properties and fire resistance in relation to)

=> d l64 1-17 cbib abs hitstr hitind

L64 ANSWER 1 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

2003:49087 Document No. 138:392561 Photo-physical and lasing characterization of neat films of 4-methyl-TPD and of an alternating copolymer of 4-methyl-TPD with MEH-PPV. Philip, R.; Holzer, W.; Penzkofer, A.; Tillmann, H.; Horhold, H.-H. (Institut II--Experimentelle und Angewandte Physik, Universitat Regensburg, Regensburg, D-93040, Germany). Synthetic Metals, 132(3), 297-308 (English) 2003. CODEN: SYMEDZ. ISSN: 0379-6779. Publisher: Elsevier Science B.V..

AB Wave-guided traveling wave lasing, i.e. amplification of spontaneous emission in a waveguide, was studied on neat films of the triphenylamine dimer 4-methyl-TPD (N,N'-bis(4-methylphenyl)-N,N'-diphenyl-benzidine) and an alternating copolymer with MEH-PPV assigned as TPD(4M)-MEH-P-PPV. The soln. processable polymer was prepd. via the polycondensation route. Laser action is achieved by transversally pumping neat films on glass substrates with picosecond excitation pulses (wavelength 347.15 nm, duration 35 ps). Lasing occurs around 422 nm for 4-methyl-TPD and around 544 nm for TPD(4M)-MEH-P-PPV. Below laser threshold leaky mode emission into the substrate along the film/surface interface is reported for 4-methyl-TPD. The optical consts. (absorption spectra and refractive index spectra), the absorption cross-section spectra, fluorescence quantum distributions, fluorescence quantum yields, and fluorescence lifetimes of the samples are detd. for photo-phys. characterization. The laser performance and the photo-phys. parameters of 4-methyl-TPD are compared with the mol. 3-methyl-TPD and the nonconjugated polymer poly-TPD(4M)-DPX which is built up of 4-methyl-TPD and .alpha.,.alpha.'-diphenylxylylene units. The parameters of TPD(4M)-MEH-P-PPV are compared with the parameters of TPD(4M)-MEH-PPV another alternating copolymer of 4-methyl-TPD with MEH-PPV. The synthesis details for TPD(4M)-MEH-PPV and TPD(4M)-MEH-P-PPV are given.

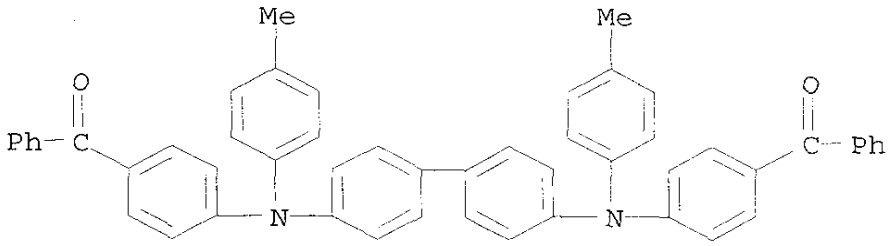
IT **525588-70-9P**
(actual monomers; photo-phys. and lasing characterization of neat films of 4-Me-TPD and of an alternating copolymer of 4-Me-TPD with MEH-PPV)

RN 525588-70-9 HCAPLUS

CN Phosphonic acid, [[2-[(2-ethylhexyl)oxy]-5-methoxy-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with [[1,1'-biphenyl]-4,4'-diylbis[[(4-methylphenyl)imino]-4,1-phenylene]]bis[phenylmethanone] (9CI) (CA INDEX NAME)

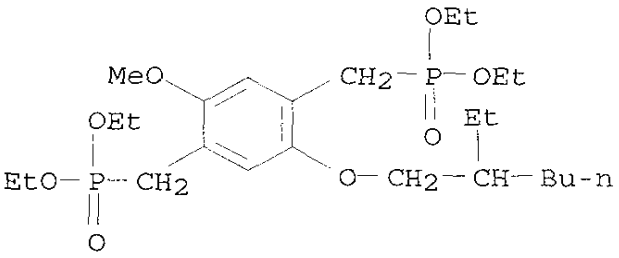
CM 1

CRN 525588-69-6
CMF C52 H40 N2 O2



CM 2

CRN 181307-48-2
CMF C25 H46 O8 P2



CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 36

IT 391257-49-1P **525588-70-9P**
(actual monomers; photo-phys. and lasing characterization of neat films of 4-Me-TPD and of an alternating copolymer of 4-Me-TPD with MEH-PPV)

L64 ANSWER 2 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
2002:299601 Document No. 137:176650 MEH-PPV and thianthrene-containing PPV-derivatives as efficient polymeric materials for solid-state lasers. Hoerhold, Hans-Heinrich; Tillmann, Hartwig; Bader, Cornelia; Klemm, Elisabeth; Holzer, Wolfgang; Penzkofer, Alfons (Innovent Technologieentwichklung e.V., Jena, 07745, Germany). Proceedings of SPIE-The International Society for Optical Engineering, 4464(Organic Light-Emitting Materials and Devices V), 317-328 (English) 2002. CODEN: PSISDG. ISSN: 0277-786X. Publisher: SPIE-The International Society for Optical Engineering.

AB Using the methodol. of traveling-wave lasing in neat films (amplified spontaneous emission, ASE) the authors have studied the novel polycondensation-type MEH-PPV 1(strictly linear and fully conjugated) and some of its alternating copolymer combinations with

2,5-dialkoxy-phenylenevinylene (2-5) and thianthrene-vinylene (6-8) units. Well-defined, soln.- processable, high-mol. wt. samples (Mw = 20.000 - 60.000) were prepd. via the polycondensation route employing the repetitive HORNER carbonyl-olefination. This is based on the reaction of appropriate xylylene bis(phosphonates) with dialkoxy-substituted phenylene dialdehydes and dibenzoyl-thianthrene (dibenzoyl-benzene), resp. In previous studies Thianthrene-PPVs are reported to display green EL from single layer devices while the dialkoxy-PPVs are known to display orange or red EL. Here, traveling-wave lasing studies were performed on neat films. Soln. cast amorphous film samples on glass substrates are transversally pumped with picosecond laser pulses (wavelength 347 nm, duration 35 ps). Lasing occurs at 622 nm for MEH-PPV 1, 646 nm (M3EH-PPV 2), 629 nm (MEH-DOO-PPV 3), 629 nm (DMO-DO18-PPV 4), 522 nm (Thianthrene-MEH-PPV 7) and at 647 nm and 630 nm for the new M3EH-OPV contg. terpolymers (DP-MEH-OPV)0,25n(M3EH-OPV)0,75n 5 and (Thianthrene-MEH-OPV)0,5n(M3EH-OPV)0,5n 8, resp. The spectral widths of emission are < 13 nm. Laser threshold energy densities are rather low, ranging between 4 and 18 .mu.Jcm-2. The effective lengths of amplification are roughly 1 mm. These results show that all the condensation polymers under study are good solid-state laser materials for optically pumped disk, ring and DFB lasers and that they are potential candidates for elec. pumped lasers. Also, amorphous blends of the polycondensation-type MEH-PPV 1 with the electroactive DPOP-PPV (ratio 50:50, 30:70 p wt.) or Thianthrene-MEH-PPV 7 (ratio 50:50, 22:78 and 5.6:94.4 p wt.) exhibit red ASE around 590 - 615 nm as the result of energy (exciton) transfer from the green emitting donor materials to the MEH- PPV acceptors.

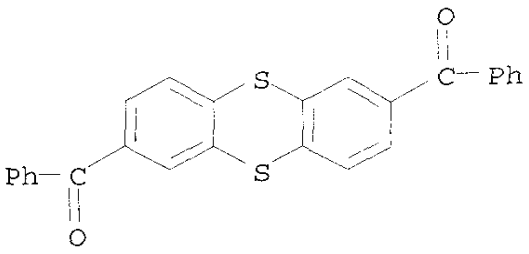
IT **176856-39-6P 446859-88-7P 446859-89-8P 446859-90-1P**
(MEH-PPV and thianthrene-contg. PPV-derivs. as efficient polymeric materials for solid-state lasers)

RN 176856-39-6 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 2,7-thianthrenediylbis[phenylmethanone] (9CI) (CA INDEX NAME)

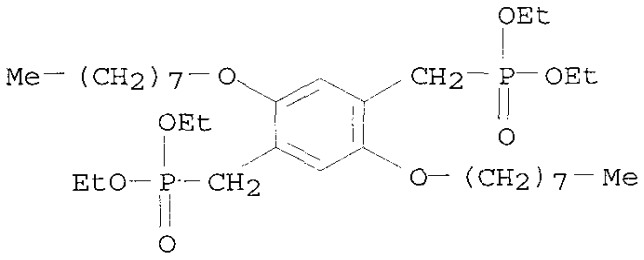
CM 1

CRN 176856-38-5
CMF C26 H16 O2 S2



CM 2

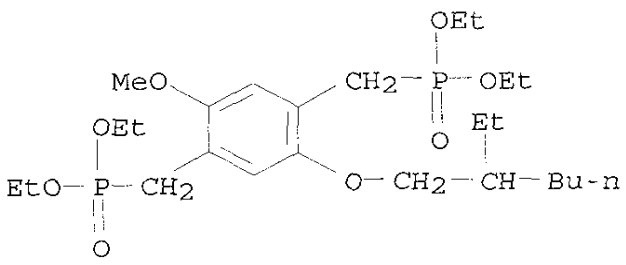
CRN 176856-31-8
CMF C32 H60 O8 P2



RN 446859-88-7 HCAPLUS
CN Phosphonic acid, [[2-[(2-ethylhexyl)oxy]-5-methoxy-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 2,5-dimethoxy-1,4-benzenedicarboxaldehyde and 1,4-phenylenebis[phenylmethanone] (9CI) (CA INDEX NAME)

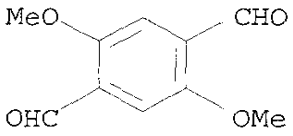
CM 1

CRN 181307-48-2
CMF C25 H46 O8 P2



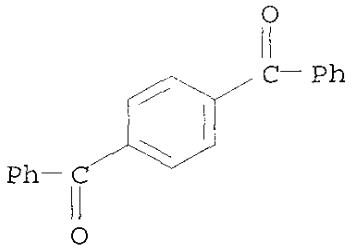
CM 2

CRN 7310-97-6
CMF C10 H10 O4



CM 3

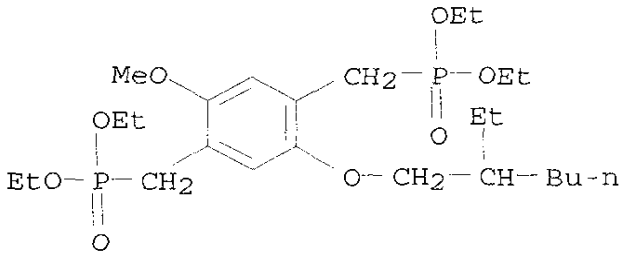
CRN 3016-97-5
CMF C20 H14 O2



RN 446859-89-8 HCAPLUS
CN Phosphonic acid, [[2-[(2-ethylhexyl)oxy]-5-methoxy-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 2,7-thianthrenediylbis[phenylmethanone] (9CI) (CA INDEX NAME)

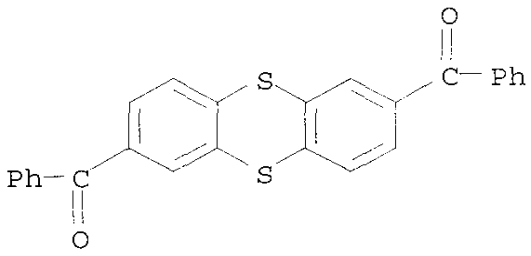
CM 1

CRN 181307-48-2
CMF C25 H46 O8 P2



CM 2

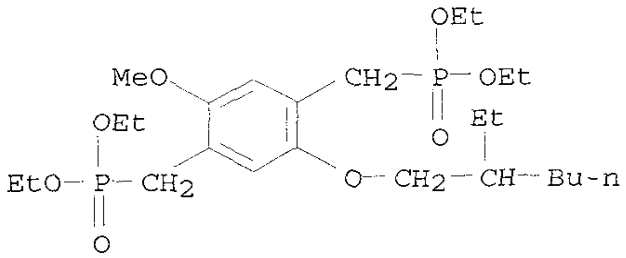
CRN 176856-38-5
CMF C26 H16 O2 S2



RN 446859-90-1 HCAPLUS
CN Phosphonic acid, [[2-[(2-ethylhexyl)oxy]-5-methoxy-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 2,5-dimethoxy-1,4-benzenedicarboxaldehyde and 2,7-thianthrenediylbis[phenylmethanone] (9CI) (CA INDEX NAME)

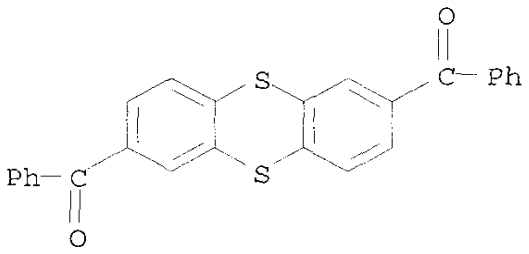
CM 1

CRN 181307-48-2
CMF C25 H46 O8 P2



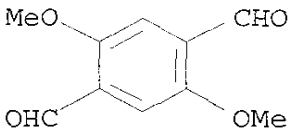
CM 2

CRN 176856-38-5
CMF C26 H16 O2 S2



CM 3

CRN 7310-97-6
CMF C10 H10 O4



CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 38

IT 138184-36-8P, MEH PPV **176856-39-6P** 176856-40-9P
240816-75-5P 240816-76-6P 245749-91-1P, M3EH-PPV 350704-90-4P
350831-46-8P 446859-86-5P 446859-87-6P **446859-88-7P**
446859-89-8P 446859-90-1P 446877-78-7P
(MEH-PPV and thianthrene-contg. PPV-derivs. as efficient polymeric materials for solid-state lasers)

L64 ANSWER 3 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
2002:279657 Document No. 137:12836 Corrugated neat thin-film conjugated polymer distributed-feedback lasers. Holzer, W.; Penzkofer, A.; Pertsch, T.; Danz, N.; Brauer, A.; Kley, E. B.; Tillmann, H.; Bader, C.; Horhold, H.-H. (Institut II - Experimentelle und Angewandte Physik, Universitat Regensburg, Regensburg, 93053, Germany). Applied Physics B: Lasers and Optics, 74(4-5), 333-342 (English) 2002. CODEN: APBOEM. ISSN: 0946-2171. Publisher: Springer-Verlag.

AB Wave-guided thin-film distributed-feedback (DFB) polymer lasers are fabricated by spin coating a PPV-derived semiconducting polymer, thianthrene-DOO-PPV, onto oxidized Si wafers with corrugated 2nd-order periodic gratings. The gratings are written by reactive ion beam etching. Laser action is achieved by transverse pumping with picosecond laser pulses (wavelength 347.15 nm, duration 35 ps). The DFB-laser surface emission and edge emission are analyzed. Outside the grating region the polymer film was used for comparative wave-guided traveling wave laser (amplified spontaneous emission (ASE)) studies. The pump pulse threshold energy d. for wave-guided DFB-laser action (4-9 .mu.J cm-2) is approx. a factor of two lower than the threshold for wave-guided traveling wave laser action. The spectral width of the DFB laser (down to .DELTA..lambda.DFB .apprxeq. 0.07 nm) is considerably narrower than that of the traveling wave laser (.DELTA..lambda.TWL .apprxeq. 14 nm). The DFB-laser emission is highly linearly polarized transverse to the grating axis (TE mode). Only at high pump pulse energy densities does an addnl. weak TM mode build up. The surface-emitted DFB-laser radiation has a low divergence along the grating direction. For both the DFB lasers and the traveling wave lasers, gain satn. occurs at high excitation energy densities.

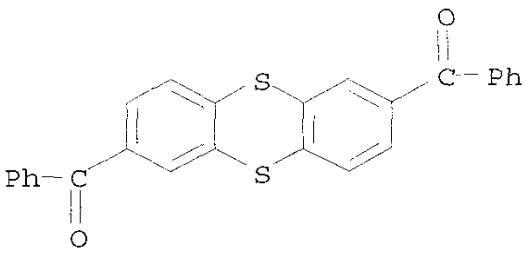
IT **176856-39-6**
(corrugated neat thin-film conjugated polymer distributed-feedback lasers)

RN 176856-39-6 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 2,7-thianthrenediylbis[phenylmethanone] (9CI) (CA INDEX NAME)

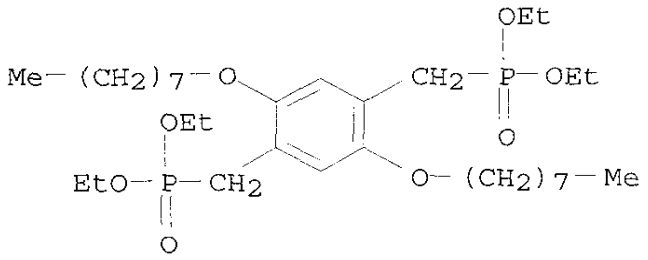
CM 1

CRN 176856-38-5
CMF C26 H16 O2 S2



CM 2

CRN 176856-31-8
CMF C32 H60 O8 P2



CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

IT **176856-39-6** 176856-40-9
(corrugated neat thin-film conjugated polymer distributed-feedback lasers)

L64 ANSWER 4 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

2001:355788 Document No. 135:122843 Bulky side-group polymers - synthesis and characterization. Maier, Stefanie; Drury, Anna; Davey, Andrew P.; Byrne, Hugh J.; Blau, Werner (Materials ireland Polymer Research Centre, Department of Physics, Trinity College Dublin, Dublin, Ire.). Synthetic Metals, 119(1-3), 85-86 (English) 2001. CODEN: SYMEDZ. ISSN: 0379-6779. Publisher: Elsevier Science S.A..

AB A series of conjugated polymers related to poly(phenylenevinylene) (PPV) was synthesized and characterized. These polymers contain phenylene moieties attached to the vinylene unit with various substitution patterns to obtain very complex systems. Some polymers only contain phenylene units along the polymer chain whereas for some of the derivs. naphthalene units were introduced into the backbone. Addnl., some derivs. were prepd. by varying para and meta substitution patterns. The influences of different structural alterations on the thermal behavior, the optical properties and electrochem. behavior are investigated. In general, the polymers are temp.-stable up to 350.degree., emit in the blue to green region of the visible spectrum and contain varying oxidn. and redn. potentials depending on the substitution pattern.

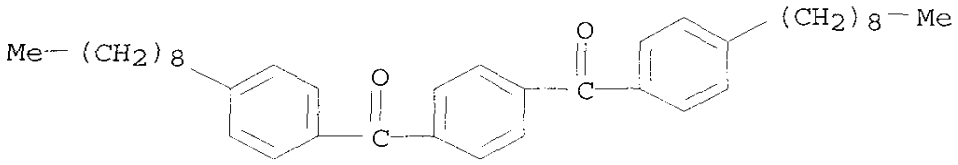
IT **241490-29-9P 241490-31-3P 241490-33-5P**
350610-66-1P 350610-68-3P 350610-70-7P
350610-72-9P 350610-75-2P 350610-77-4P
350610-79-6P 350610-81-0P 350610-83-2P
350610-85-4P 350610-87-6P 350610-89-8P
350610-91-2P
(prepn. and characterization of conjugated poly(phenylenevinylene) derivs.)

RN 241490-29-9 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(4-nonylphenyl)methanone] (9CI) (CA INDEX NAME)

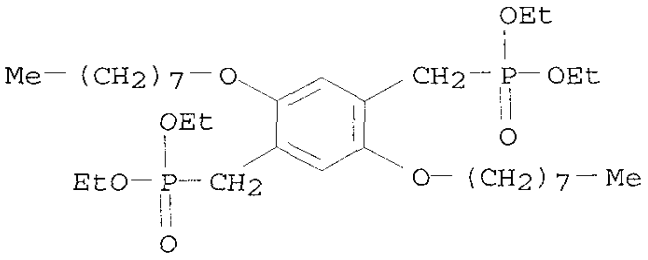
CM 1

CRN 241490-21-1
CMF C38 H50 O2



CM 2

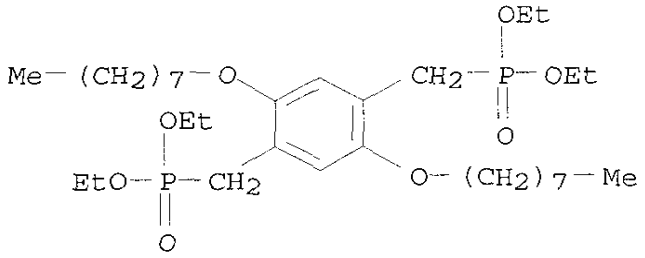
CRN 176856-31-8
CMF C32 H60 O8 P2



RN 241490-31-3 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(3,4-dimethoxyphenyl)methanone] (9CI) (CA INDEX NAME)

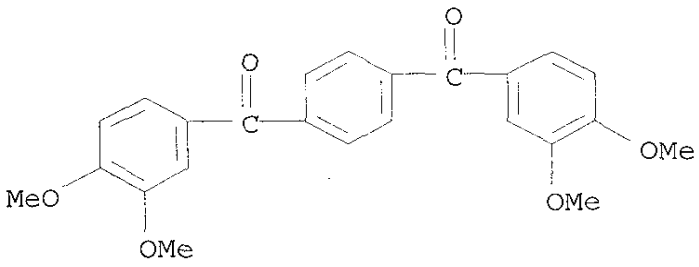
CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



CM 2

CRN 95560-64-8
CMF C24 H22 O6



RN 241490-33-5 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(4-nonylphenyl)methanone] (9CI) (CA INDEX NAME)

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CRN 241490-26-6
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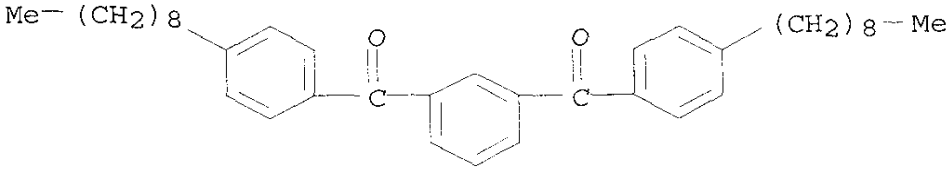
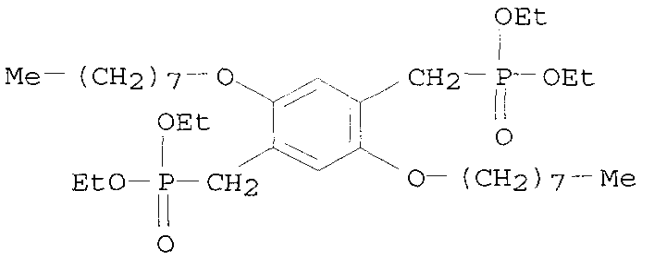


CM 2

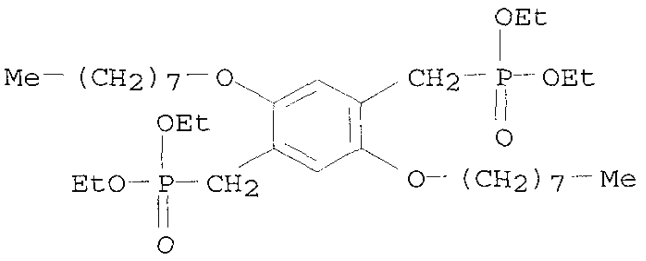
CRN 176856-31-8
CMF C32 H60 O8 P2



RN 350610-66-1 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(4-methoxyphenyl)methanone] (9CI) (CA INDEX NAME)

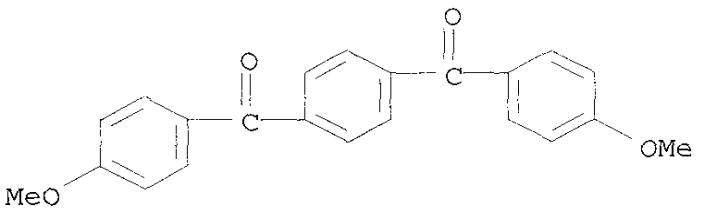
CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



CM 2

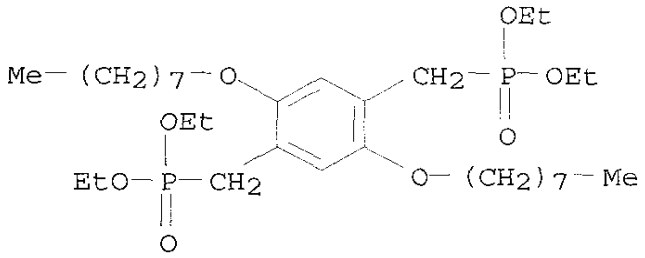
CRN 15517-45-0
CMF C22 H18 O4



RN 350610-68-3 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(4-methylphenyl)methanone] (9CI) (CA INDEX NAME)

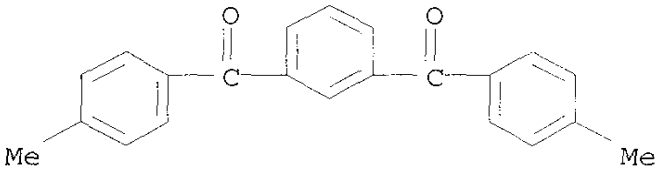
CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



CM 2

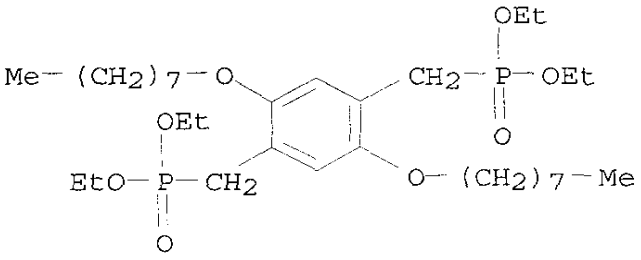
CRN 71400-25-4
CMF C22 H18 O2



RN 350610-70-7 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(4-methoxyphenyl)methanone] (9CI) (CA INDEX NAME)

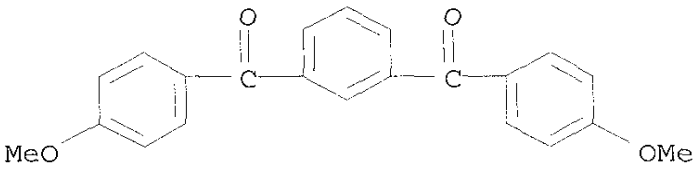
CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



CM 2

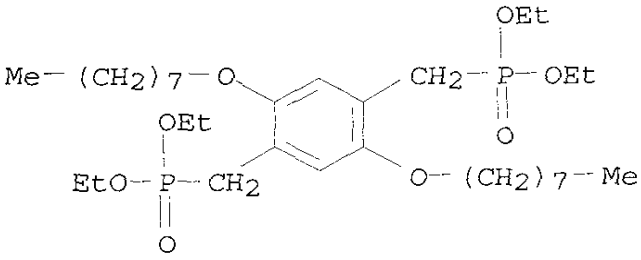
CRN 7477-29-4
CMF C22 H18 O4



RN 350610-72-9 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[phenylmethanone] (9CI) (CA INDEX NAME)

CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



CM 2

CRN 3770-82-9
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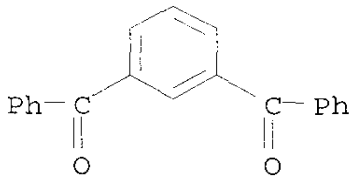
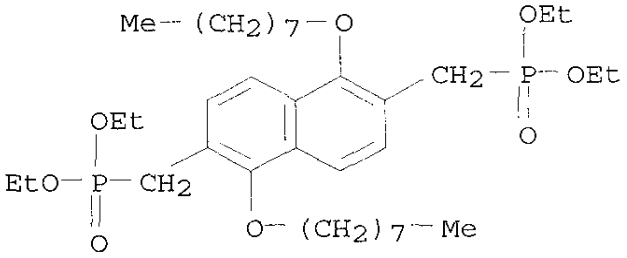


RN 350610-75-2 HCAPLUS
CN Phosphonic acid, [[1,5-bis(octyloxy)-2,6-naphthalenediyl]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(3,4-dimethylphenyl)methanone] (9CI) (CA INDEX NAME)

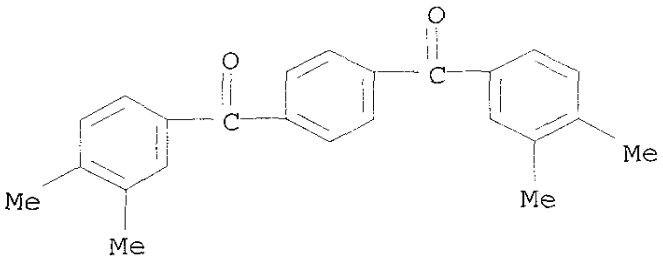
CM 1

CRN 350610-74-1
CMF C36 H62 O8 P2



CM 2

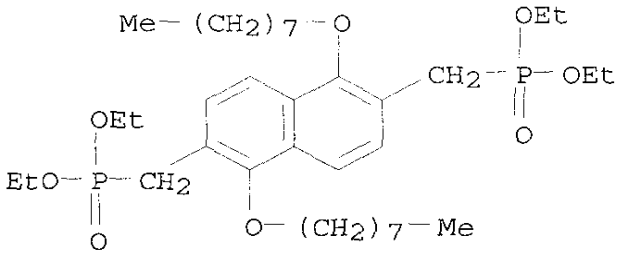
CRN 23602-87-1
CMF C24 H22 O2



RN 350610-77-4 HCAPLUS
CN Phosphonic acid, [[1,5-bis(octyloxy)-2,6-naphthalenediyl]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(4-methylphenyl)methanone] (9CI) (CA INDEX NAME)

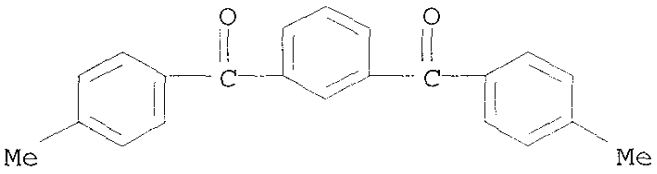
CM 1

CRN 350610-74-1
CMF C36 H62 O8 P2



CM 2

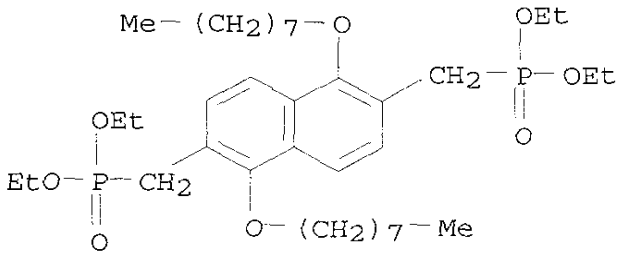
CRN 71400-25-4
CMF C22 H18 O2



RN 350610-79-6 HCAPLUS
CN Phosphonic acid, [[1,5-bis(octyloxy)-2,6-naphthalenediyl]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(3,4-dimethylphenyl)methanone] (9CI) (CA INDEX NAME)

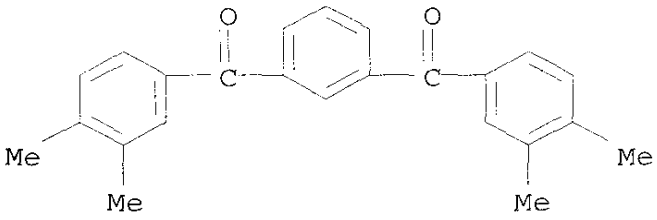
CM 1

CRN 350610-74-1
CMF C36 H62 O8 P2



CM 2

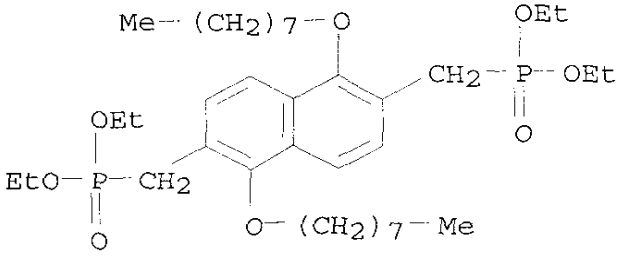
CRN 23602-89-3
CMF C24 H22 O2



RN 350610-81-0 HCAPLUS
CN Phosphonic acid, [[1,5-bis(octyloxy)-2,6-naphthalenediyl]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(3,4-dimethoxyphenyl)methanone] (9CI) (CA INDEX NAME)

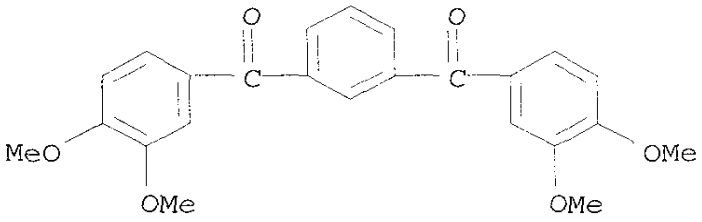
CM 1

CRN 350610-74-1
CMF C36 H62 O8 P2



CM 2

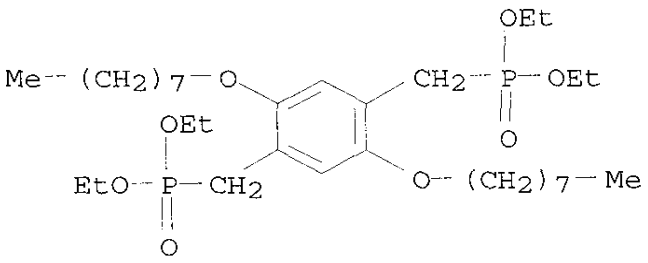
CRN 98274-43-2
CMF C24 H22 O6



RN 350610-83-2 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(4-methylphenyl)methanone] (9CI) (CA INDEX NAME)

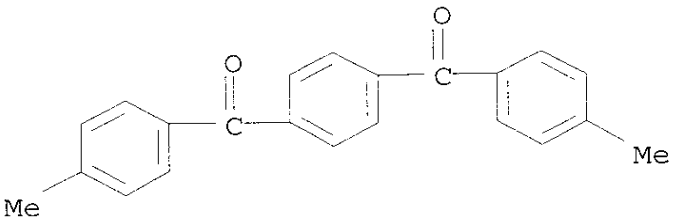
CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



CM 2

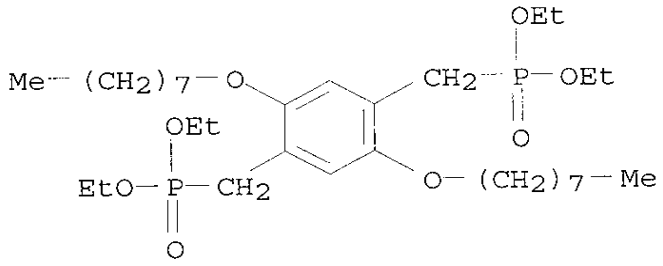
CRN 61565-13-7
CMF C22 H18 O2



RN 350610-85-4 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(3,4-dimethylphenyl)methanone] (9CI) (CA INDEX NAME)

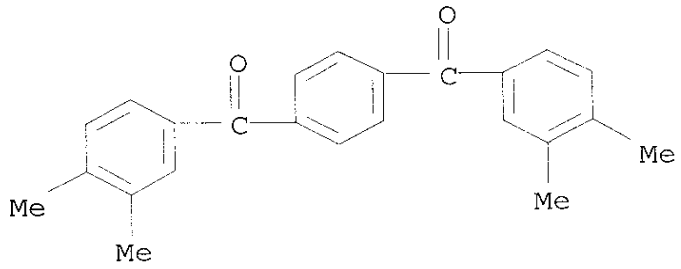
CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



CM 2

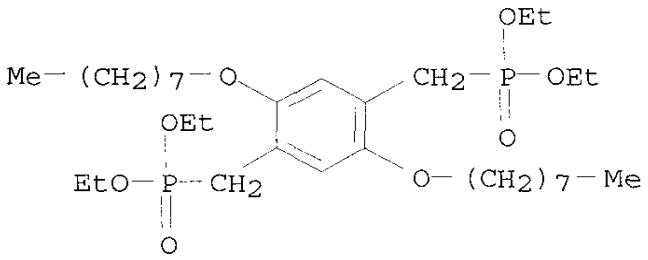
CRN 23602-87-1
CMF C24 H22 O2



RN 350610-87-6 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(3,4-dimethylphenyl)methanone] (9CI) (CA INDEX NAME)

CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



CM 2

CRN 23602-89-3
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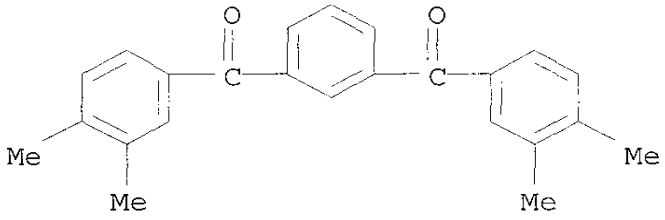
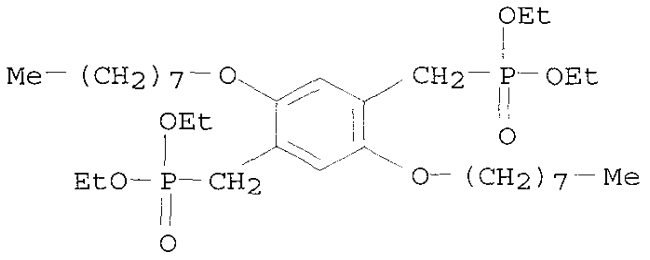


RN 350610-89-8 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(3,4-dimethoxyphenyl)methanone] (9CI) (CA INDEX NAME)

CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



CM 2

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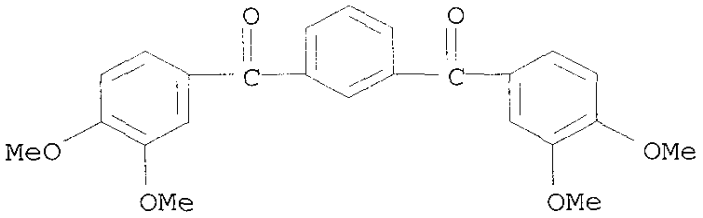
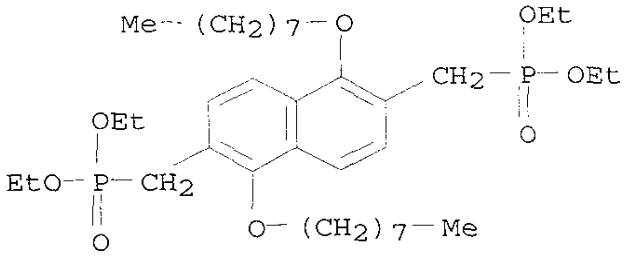


RN 350610-91-2 HCAPLUS
CN Phosphonic acid, [[1,5-bis(octyloxy)-2,6-naphthalenediyl]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(4-methoxyphenyl)methanone] (9CI) (CA INDEX NAME)

CM 1

CRN 350610-74-1
CMF C36 H62 O8 P2



CM 2

CRN 7477-29-4
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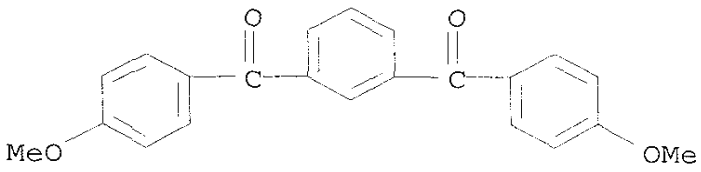


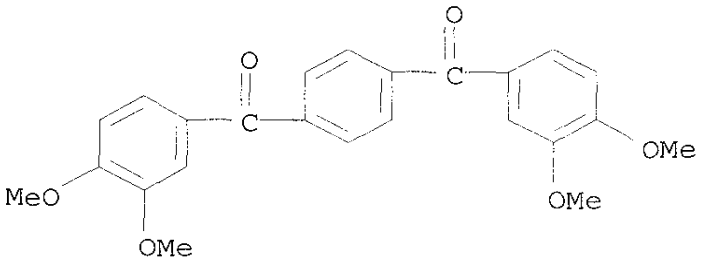
CC 35-5 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 36, 73, 76
IT **241490-29-9P** 241490-30-2P **241490-31-3P**
241490-32-4P **241490-33-5P** 241490-34-6P
350610-66-1P 350610-67-2P **350610-68-3P**
350610-69-4P **350610-70-7P** 350610-71-8P
350610-72-9P 350610-73-0P **350610-75-2P**
350610-76-3P **350610-77-4P** 350610-78-5P
350610-79-6P 350610-80-9P **350610-81-0P**
350610-82-1P **350610-83-2P** 350610-84-3P
350610-85-4P 350610-86-5P **350610-87-6P**
350610-88-7P **350610-89-8P** 350610-90-1P
350610-91-2P 350610-92-3P
(prepn. and characterization of conjugated poly(phenylenevinylene) derivs.)

L64 ANSWER 5 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1999:459142 Document No. 131:200150 Mono- and polycyclic aromatic polymers - synthesis and properties. Maier, S.; Davey, A. P.; Drury, A.; Byrne, H. J.; Blau, W. (Dep. Physics, Univ. Dublin, Dublin, 2, Ire.). Synthetic Metals, 101(1-3), 31-32 (English) 1999. CODEN: SYMEDZ. ISSN: 0379-6779. Publisher: Elsevier Science S.A..
AB A series of new mono- and polycyclic vinylene copolymers was synthesized via polycondensation of substituted vinylphenols and 2,6-substituted and m-phenyl-substituted naphthalene monomers using KOtBu as catalyst and toluene as solvent, under Ar. The polymers obtained have color that varies from pale to very bright yellow, are sol. in toluene, chloroform, and trichlorobenzene. The emission max. of the naphthalene polymers is slightly blue-shifted vs. that of poly(p-phenylene vinylene), as predicted by Hueckel calcns. of the band gap. Substitution at the meta position causes a shift to shorter wavelength vs. the para-substituted polymers, due to interruption of the .pi.-conjugation.
IT **241490-24-4P** **241490-29-9P** **241490-31-3P**
241490-33-5P
(prepn. of mono- and polycyclic arom. polyphenylenevinylenes and substituent effects on band gap and conjugation length)
RN 241490-24-4 HCAPLUS
CN Phosphonic acid, [2,6-naphthalenediylbis(methylene)]bis-, tetraethyl

ester, polymer with 1,4-phenylenebis[(3,4-dimethoxyphenyl)methanone] (9CI) (CA INDEX NAME)

CM 1

CRN 95560-64-8
CMF C24 H22 O6



CM 2

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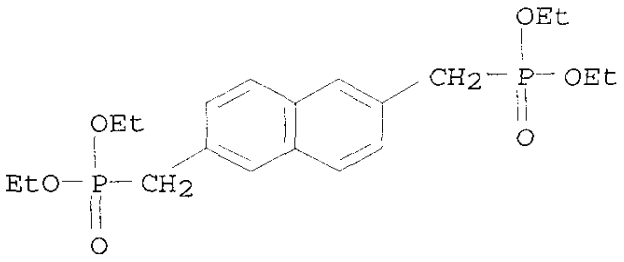
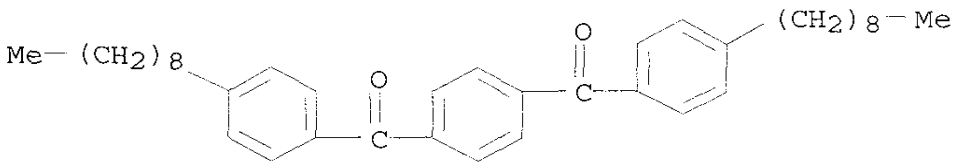


RN 241490-29-9 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(4-nonylphenyl)methanone] (9CI) (CA INDEX NAME)

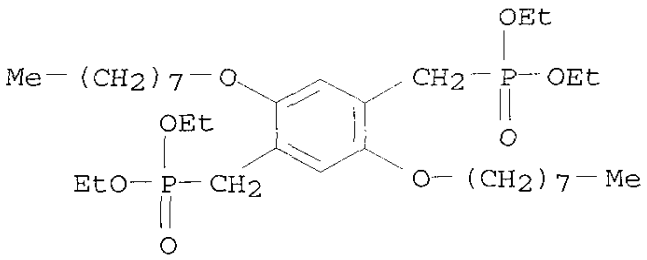
CM 1

CRN 241490-21-1
CMF C38 H50 O2



CM 2

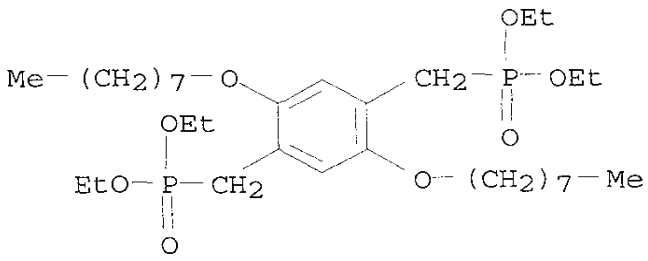
CRN 176856-31-8
CMF C32 H60 O8 P2



RN 241490-31-3 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(3,4-dimethoxyphenyl)methanone] (9CI) (CA INDEX NAME)

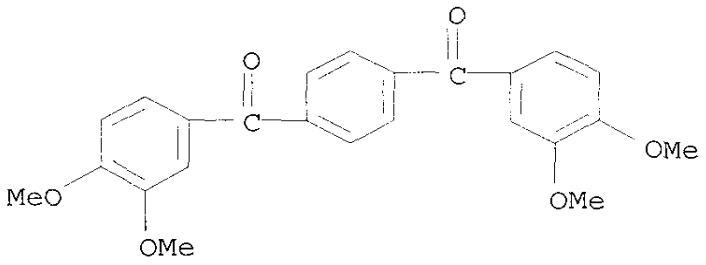
CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



CM 2

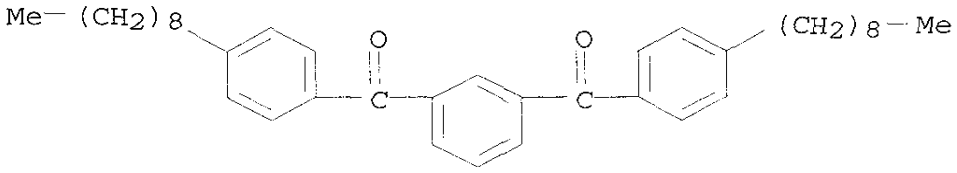
CRN 95560-64-8
CMF C24 H22 O6



RN 241490-33-5 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(4-nonylphenyl)methanone] (9CI) (CA INDEX NAME)

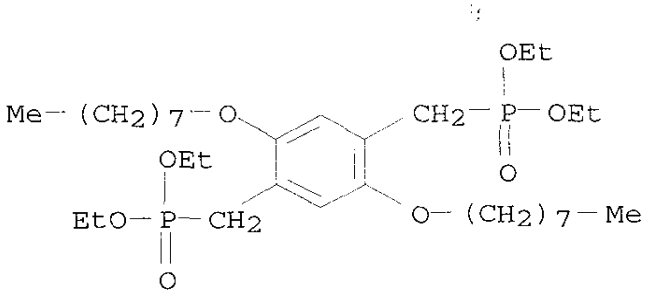
CM 1

CRN 241490-26-6
CMF C38 H50 O2



CM 2

CRN 176856-31-8
CMF C32 H60 O8 P2

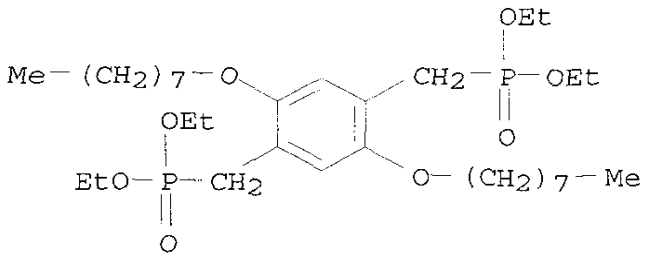


CC 35-5 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 36, 76
IT 241490-22-2P 241490-23-3P **241490-24-4P** 241490-25-5P
241490-27-7P 241490-28-8P **241490-29-9P** 241490-30-2P
241490-31-3P 241490-32-4P **241490-33-5P**
241490-34-6P
(prepn. of mono- and polycyclic arom. polyphenylenevinylenes and substituent effects on band gap and conjugation length)

L64 ANSWER 6 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1998:321284 Document No. 129:16522 Ordered poly(arylenevinylene) terpolymers, their manufacture and use as electroluminescent materials. Kreuder, Willi; Hoerhold, Hans-Heinrich; Rost, Henning; Hartmann, Annett (Hoechst A.-G., Germany). Ger. Offen. DE 19646877 A1 19980514, 18 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1996-19646877 19961113.
AB The polymers have the order (ABCB)n, where A, B, and C are different arylenevinylene units :CR1XCR2: [R1, R2 = H, (un)substituted C1-22 hydrocarbyl; X = (hetero)arylene] and can be used in electroluminescent displays and lighting elements. Thus, 0.005 mol 2,5-dimethoxyterephthalaldehyde was condensed with 0.010 mol tetra-Et 2,5-bis(octyloxy)-p-xylylenediphosphonate in toluene at 80.degree. in the presence of 0.01 mol tert-BuOK, and the product was polycondensed with 0.005 mol 4,4'-diformylbenzophenone by using another 0.01 mol tert-BuOK to give a polymer with Mn 4600, Mw 14,100, Tg 41.degree., absorption .lambda.max 452 nm, emission .lambda.max 535 nm as a red powder in 46% yield.
IT **207733-43-5P 207733-70-8P**
(ordered poly(arylenevinylene) terpolymers as electroluminescent materials)
RN 207733-43-5 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 4,4'-carbonylbis[benzaldehyde] and 2,5-dimethoxy-1,4-benzenedicarboxaldehyde (9CI) (CA INDEX NAME)

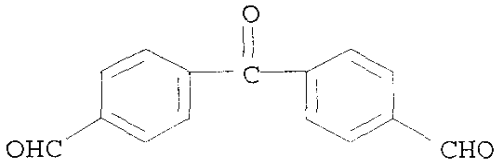
CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



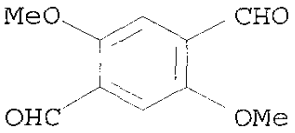
CM 2

CRN 162896-87-9
CMF C15 H10 O3



CM 3

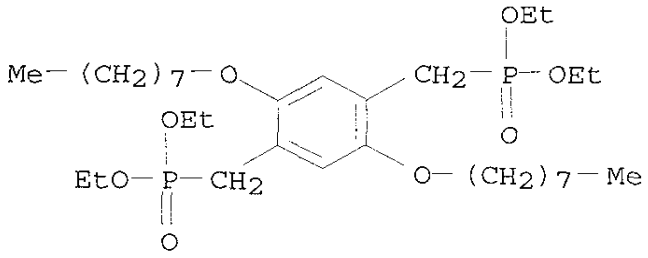
CRN 7310-97-6
CMF C10 H10 O4



RN 207733-70-8 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 4,4'-carbonylbis[benzaldehyde] and 4,4'-(phenylimino)bis[benzaldehyde] (9CI) (CA INDEX NAME)

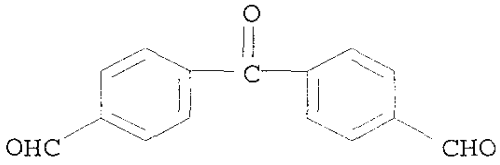
CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



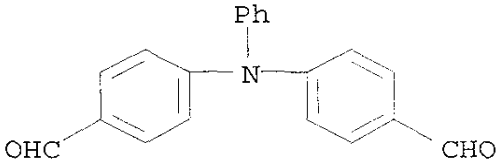
CM 2

CRN 162896-87-9
CMF C15 H10 O3



CM 3

CRN 53566-95-3
CMF C20 H15 N O2



IC ICM C08G061-00
ICS C09K011-06; H05B033-14; C07C015-50; C07C015-52; C07C001-32; C07C047-575; C07C045-45
ICA C08G061-02; C08G061-12; C07C323-22; C07D333-06; C07D339-08
CC 35-5 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 38, 73
IT **207733-43-5P** 207733-46-8P 207733-50-4P 207733-53-7P
207733-56-0P 207733-60-6P 207733-62-8P 207733-64-0P
207733-66-2P 207733-68-4P **207733-70-8P** 207733-72-0P
207733-78-6P 207733-80-0P 207733-85-5P 207733-86-6P

(ordered poly(arylenevinylene) terpolymers as electroluminescent materials)

L64 ANSWER 7 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1998:90649 Document No. 128:186034 Synthesis and electroluminescence of novel DSB-segmented copolymers of the PAV/PPV type. Horhold, Hans-Henrich; Rost, Henning; Teuschel, Annett; Kreuder, Willi; Spreitzer, Hubert (Institute Organic Chemistry Macromolecular Chemistry, University Jena, Jena, 07743, Germany). Proceedings of SPIE-The International Society for Optical Engineering, 3148(Organic Light-Emitting Materials and Devices), 139-150 (English) 1997. CODEN: PSISDG. ISSN: 0277-786X. Publisher: SPIE-The International Society for Optical Engineering.

AB In this paper recent advances in the development of a novel class of highly efficient DSB-segmented copolymers 1-5 are reported. [-Y-C6H4-CH=CH-C6H2(OR)2-CH=CH-C6H4-]n, 1 Y = NPh, 2 Y = O, 3 Y = CO, 4 Y = CHOH, [-Y-C6H4-CH=CR'-C6H4-CR'=CH-C6H4-]n, 5 Y = NPh, R' = Ch3OC6H4, where 1, 2, 3 have successfully been synthesized using the HORNER/WITTIG carbonyl olefination of appropriate dialdehydes which are based on triphenylamine, diphenylether, and diphenylketone. 4 Was prepd. by polymer analogous carbonyl redn. of 3. This approach resulted in high mol. and sol. materials (Mn 10.000-20.000) exhibiting green (1, 3) and blue (2, 3) luminescence with an excellent photoluminescence efficiency (65-90% in soln.). Goal in this paper is to illustrate the changes in the electrooptical properties that were caused by segmentation of the polyconjugated PPV backbone into distyrylbenzene (SDB) segments which are connected by mono-at. Y groups. The chem. character of Y dets. significantly the oxidn. potentials(EOX = 0,66 V (1), 0,92 V (2), 1,15 V (3), 1,04 V (4), V vs. Ag/AgCl). Due to its low and reversible oxidn. potential 1 shows the most favorable properties for low voltage LED's: green electroluminescence with luminance at 100-500 cd/m2 at 7-10 V was demonstrated. There also was prepd. an electron donating polymer 5 having addnl. Ph substituents attached to the vinylenic unit. These Ph groups are responsible for high glass transition temp. (TG 197.degree.) and helped to solubilize the chain.

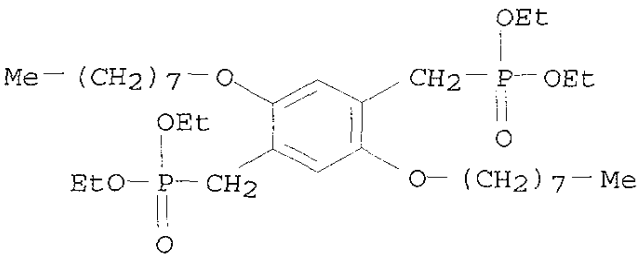
IT **189075-38-5**
(synthesis and electroluminescence of novel DSB-segmented copolymers of PAV/PPV type)

RN 189075-38-5 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with [(phenylimino)di-4,1-phenylene]bis[phenylmethanone] (9CI) (CA INDEX NAME)

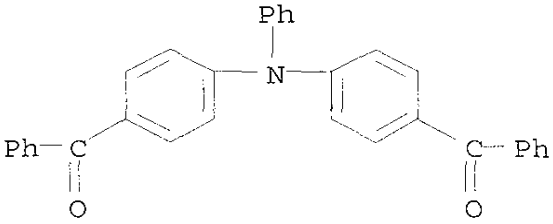
CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



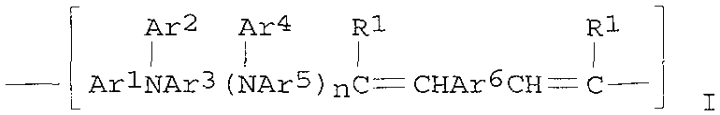
CM 2

CRN 16911-34-5
CMF C32 H23 N O2



CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
IT 188744-21-0 188982-22-1 188982-23-2 **189075-38-5**
203448-66-2 203448-67-3 203448-68-4
(synthesis and electroluminescence of novel DSB-segmented copolymers of PAV/PPV type)

L64 ANSWER 8 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1997:317758 Document No. 126:299531 Polymers containing triarylamine units for use as electroluminescent materials. Kreuder, Willi; Hoerhold, Hans-Heinrich; Rost, Henning (Hoechst A.-G., Germany). PCT Int. Appl. WO 9709394 A1 19970313, 54 pp. DESIGNATED STATES: W: CN, JP, KR; RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (German). CODEN: PIXXD2. APPLICATION: WO 1996-EP3852 19960903. PRIORITY: DE 1995-19532574 19950904; DE 1995-19535938 19950927.
GI



I

AB Electroluminescent materials are described which include .gtoreq.1 polymers contg. structural units of the formula I (Ar1-6 = the same or different mononuclear and/or polynuclear aryl and/or heteroaryl groups which may be crosslinked by one or more bridges and/or condensed and which may also be substituted; Ar1, Ar3, Ar5, and Ar6 are linked to the chain by two bonds and Ar2 and Ar4 by one bond; R1 = H, a C1-22 hydrocarbon group which may be substituted, preferably with F, and may also contain hetero atoms, preferably O, or Ar7; Ar7 is independently selected from the same groups from which Ar1-6 are selected; and n = 0, 1, or 2). Methods for prepg. the polymers are also described which entail condensation of selected bisaldehydes or bisketones with an organophosphorus compd. The properties of the electroluminescent materials include a low electroluminescence onset voltage and high efficiency, even though the polymers are not conjugated systems. Electroluminescent devices employing the polymers and the polymers themselves are also claimed.

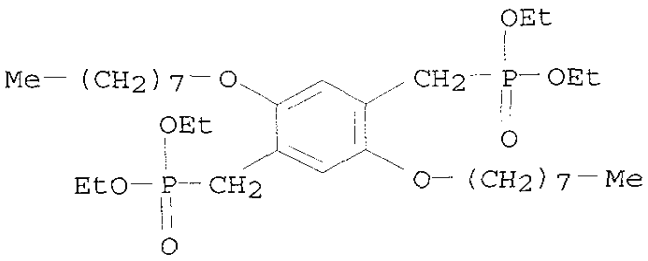
IT **189075-38-5**
(polymers contg. triarylamine units for use as electroluminescent materials and their prepn. and devices using them)

RN 189075-38-5 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with [(phenylimino)di-4,1-phenylene]bis[phenylmethanone] (9CI) (CA INDEX NAME)

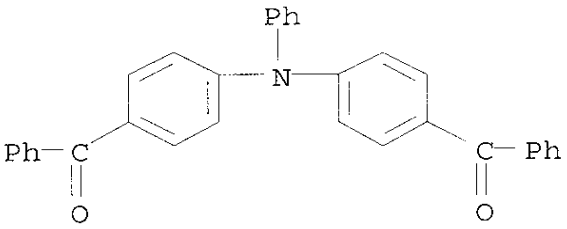
CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



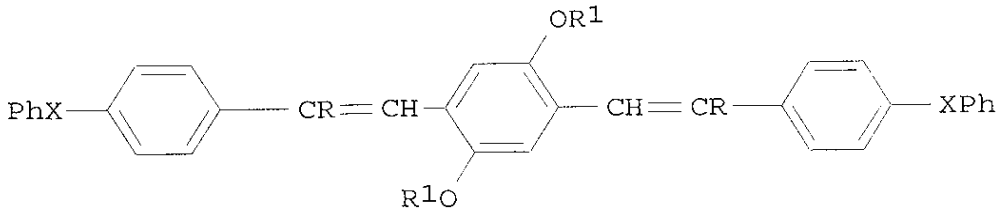
CM 2

CRN 16911-34-5
CMF C32 H23 N O2



IC ICM C09K011-06
ICS H05B033-14
CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
IT 68-12-2, reactions 122-52-1, Triethylphosphite 437-25-2 603-34-9, Triphenylamine 10025-87-3, Phosphorylchloride 16911-34-5 30525-89-4, Paraformaldehyde 60491-94-3 67399-94-4 **189075-38-5** 189075-44-3
(polymers contg. triarylamine units for use as electroluminescent materials and their prepn. and devices using them)

L64 ANSWER 9 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1997:217311 Document No. 126:278150 Novel light emitting and photoconducting polyarylenevinylene derivatives containing phenylene arylamine and phenylene oxide units in the main chain. Rost, H.; Teuschel, A.; Pfeiffer, S.; Hoerhold, H.-H. (University of Jena, Institute of Organic Chemistry and Macromolecular Chemistry, Humboldtstr. 10, Jena, 07743, Germany). Synthetic Metals, 84(1-3), 269-270 (English) 1997. CODEN: SYMEDZ. ISSN: 0379-6779. Publisher: Elsevier.
GI



I

AB Four new copolymers with alternating phenylenevinylene and arylenevinylene units were synthesized using the Horner reaction between the appropriate dialdehyde/diketone and a 2,5-dialkoxy-1,4-xylylenebis(di-Et phosphonate). Backbone

conjugation in the polymers, which consist of well-defined distyrylbenzene (DSB) blocks, is interrupted by arylamino or ether groups. Thin films of the polymers exhibit both photoluminescence and electroluminescence, emitting blue, green, and green yellow light. The band gap and oxidn. potential are strongly dependent on the nature of group joining the DSB units. Thus, model compds. having the structure I, where X = NPh or O, R = H or Ph, and R1 = Me or octyl, reflect well the characteristic fluorescence and redox behavior of the resp. polymers. Due to their low oxidn. potential (0.6-0.8V vs. Ag/AgCl) the N-contg. polymers are of particular interest as photoconducting and electroluminescent materials.

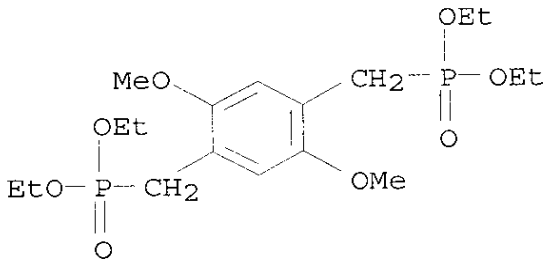
IT **188982-24-3P 188982-26-5P**
(prepn. and properties of novel light emitting and photoconducting polyarylenevinylene derivs. contg. phenylene arylamine and phenylene oxide units in main chain)

RN 188982-24-3 HCAPLUS

CN Phosphonic acid, [(2,5-dimethoxy-1,4-phenylene)bis(methylene)]bis-, tetraethyl ester, polymer with [(phenylimino)di-4,1-phenylene]bis[phenylmethanone] (9CI) (CA INDEX NAME)

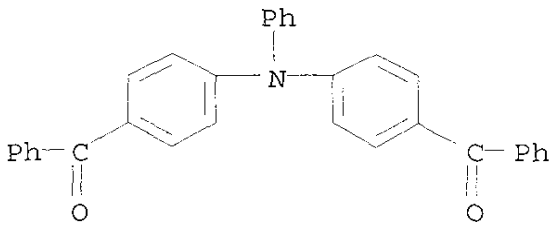
CM 1

CRN 60491-94-3
CMF C18 H32 O8 P2



CM 2

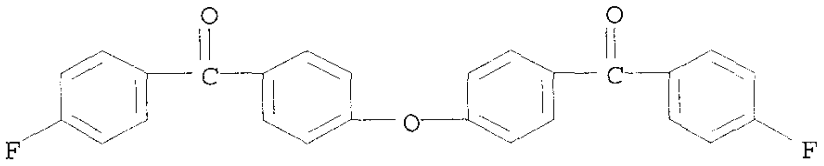
CRN 16911-34-5
CMF C32 H23 N O2



RN 188982-26-5 HCAPLUS
CN Phosphonic acid, [(2,5-dimethoxy-1,4-phenylene)bis(methylene)]bis-, tetraethyl ester, polymer with (oxydi-4,1-phenylene)bis[(4-fluorophenyl)methanone] (9CI) (CA INDEX NAME)

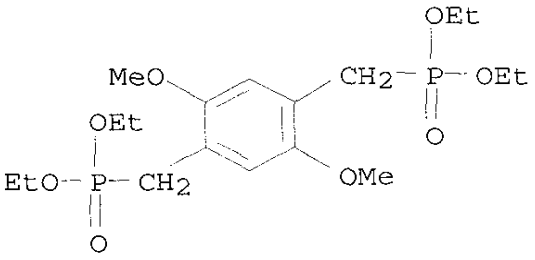
CM 1

CRN 95042-14-1
CMF C26 H16 F2 O3



CM 2

CRN 60491-94-3
CMF C18 H32 O8 P2



CC 37-5 (Plastics Manufacture and Processing)
IT 178985-14-3P 188744-19-6P 188744-21-0P 188982-22-1P
188982-23-2P **188982-24-3P** 188982-25-4P
188982-26-5P

(prepn. and properties of novel light emitting and photoconducting polyarylenevinylene derivs. contg. phenylene arylamine and phenylene oxide units in main chain)

L64 ANSWER 10 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1996:449419 Document No. 125:99554 Poly(paraphenylene vinylene) derivatives and their use as electroluminescent materials. Kreuder, Willi; Lupo, Donald; Salbeck, Josef; Schenk, Hermann; Stehlin, Thomas; Hoerhold, Hans-Heinrich; Lux, Andrea; Teuschel, Annett; Wieduwilt, Martina (Hoechst A.-G., Germany). PCT Int. Appl. WO 9610617 A1 19960411, 56 pp. DESIGNATED STATES: W: CN, JP, US; RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (German). CODEN: PIXXD2. APPLICATION: WO 1995-EP3835 19950928. PRIORITY: DE 1994-4435047 19940930; DE 1995-19505416 19950217.

AB The use as electroluminescent materials is described of polymers contg. structural units of the general formula [A1-(A2)C:CH-A3-CH:C(A2)]- (A1, A2, and A3, which are identical or different, designate mono and/or polynuclear aryl and/or heteroaryl groups which are optionally linked via one or a plurality of bridges, and preferably via one bridge, and/or are condensed and can be optionally substituted, and wherein A1 and A3 each have two bonds and A2 has one bond). The polymers are distinguished by their high degree of stability at high fluorescence quantum yields. Methods for forming the polymers by using condensation reactions of organophosphorus compds. with diketones, and electroluminescent devices employing films of the polymers, are also described.

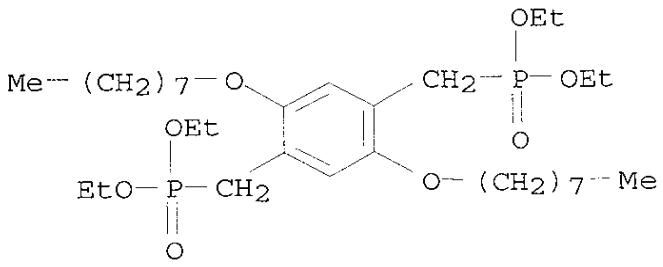
IT **176856-36-3P 176856-39-6P**
(poly(paraphenylene vinylene) derivs. and their use as electroluminescent materials)

RN 176856-36-3 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with (thiodi-4,1-phenylene)bis[phenylmethanone] (9CI) (CA INDEX NAME)

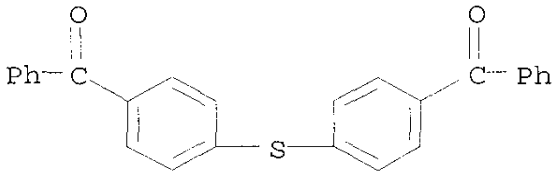
CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



CM 2

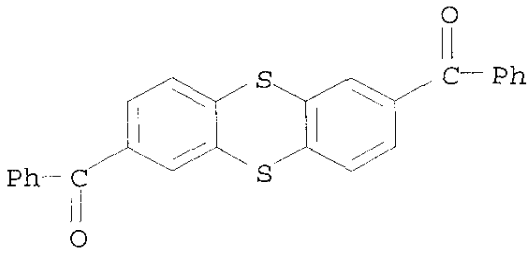
CRN 47632-47-3
CMF C26 H18 O2 S



RN 176856-39-6 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 2,7-thianthrenediylbis[phenylmethanone] (9CI) (CA INDEX NAME)

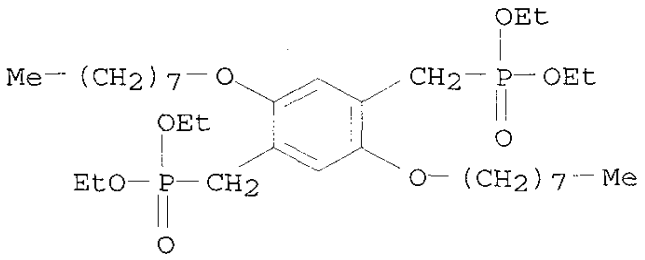
CM 1

CRN 176856-38-5
CMF C26 H16 O2 S2



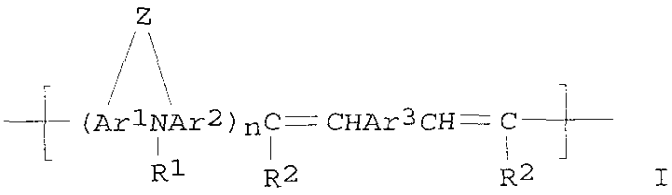
CM 2

CRN 176856-31-8
CMF C32 H60 O8 P2



IC ICM C09K011-06
ICS H05B033-14; C08G061-00
CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 38
IT 41040-05-5P 41080-42-6P 41080-43-7P 176856-32-9P
176856-33-0P 176856-34-1P 176856-35-2P **176856-36-3P**
176856-39-6P 176856-41-0P 176856-42-1P 176856-43-2P
176856-44-3P 176856-46-5P 176856-47-6P 176856-50-1P
178985-15-4P 178985-16-5P 178985-17-6P 178985-18-7P
178985-20-1P 178985-22-3P 178985-23-4P
(poly(paraphenylene vinylene) derivs. and their use as electroluminescent materials)

L64 ANSWER 11 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1996:377240 Document No. 125:34410 Nitrogenous polymers used as electroluminescent materials. Kreuder, Willi; Hoerhold, Hans-Heinrich; Rost, Henning (Hoechst A.-G., Germany). PCT Int. Appl. WO 9610598 A1 19960411, 38 pp. DESIGNATED STATES: W: CN, JP, US; RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (German). CODEN: PIXXD2. APPLICATION: WO 1995-EP3836 19950928. PRIORITY: DE 1994-4435047 19940930; DE 1995-19505416 19950217.
GI



AB The electroluminescent polymers I [Ar1-3 are mono- and/or polynuclear aryl and/or heteroaryl groups or C atoms (optionally bridged and/or condensed); Z is a single bond, O, S, SO, SO2, amino, CO, alkenylene, silylene, alkylidene; n = 1-3] have good properties

for use in illumination or displays. Vilsmeier polymn. of 3,6-dibenzoyl-9-methylcarbazole (prepd. in 79.3% yield from 9-methylcarbazole, BzCl, and AlCl3 in C2H4Cl2 at 0.degree.) with tetra-Et [[2,5-bis(octyloxy)-1,4-phenylene]dimethylene]diphosphonate in the presence of tert-BuOK in refluxing PhMe gave a polymer (II) with glass temp. 90.degree., fluorescence max. 505 nm, and mol. wt. 11,300. A film of II on In-Zn oxide had max. efficiency 0.032 and max. light d. 120 Cd/m2 at 13 V and 7 mA/4 mm2.

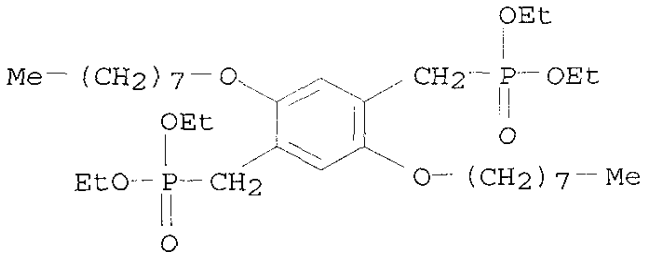
IT **177961-05-6P**
(nitrogenous polymers used as electroluminescent materials)

RN 177961-05-6 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with (9-methyl-9H-carbazole-3,6-diyl)bis[phenylmethanone] (9CI) (CA INDEX NAME)

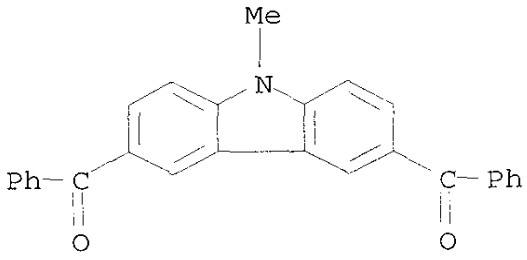
CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



CM 2

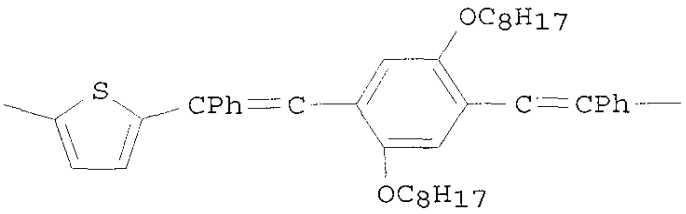
CRN 78544-71-5
CMF C27 H19 N O2



IC ICM C08G073-06

ICS C09K011-06; H05B033-14
CC 35-5 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 74
IT **177961-05-6P** 177961-06-7P 177961-07-8P 177961-08-9P
(nitrogenous polymers used as electroluminescent materials)

L64 ANSWER 12 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1996:318425 Document No. 124:345038 Poly(p-phenylenevinylene) derivatives and their use as electroluminescent materials. Kreuder, Willi; Lupo, Donald; Salbeck, Josef; Schenk, Hermann; Stehlin, Thomas; Hoerhold, Hans-Heinrich; Lux, Andrea; Teuschel, Annett; Wieduwilt, Martina (Hoechst A.-G., Germany). Ger. Offen. DE 4435047 A1 19960404, 26 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1994-4435047 19940930.
GI

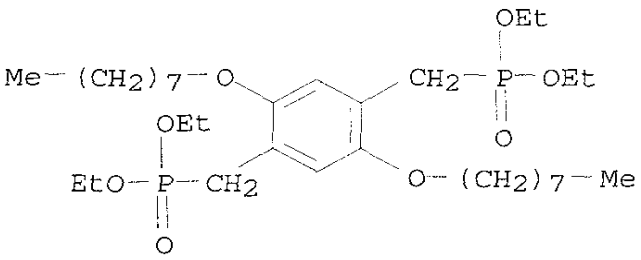


I

AB The title polymer derivs. contain units A1(A2)C:CHA3CH:C(A2) (A1-3 = mono- or polynuclear arom. or hetero arom. groups) and show good stability and high fluorescence yield. Heating 2,5-dibenzoylthiophene and 2,5-dioctoxy-1,4-xylylenebis(di-Et phosphonate) in the presence of Me3COK gave a dark-red polymer contg. units I.
IT **176856-36-3P 176856-39-6P**
(prepn. and use as electroluminescent material)
RN 176856-36-3 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with (thiodi-4,1-phenylene)bis[phenylmethanone] (9CI) (CA INDEX NAME)

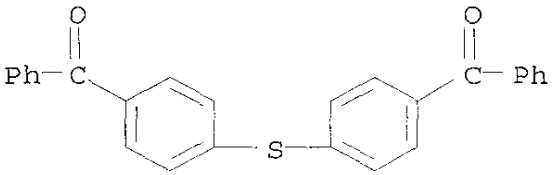
CM 1

CRN 176856-31-8
CMF C32 H60 O8 P2



CM 2

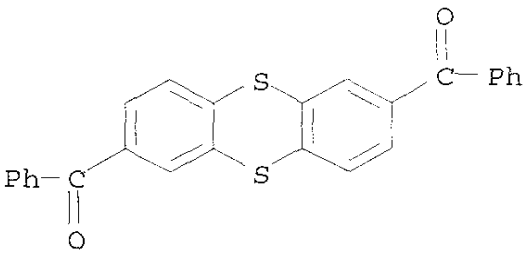
CRN 47632-47-3
CMF C26 H18 O2 S



RN 176856-39-6 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 2,7-thianthrenediylbis[phenylmethanone] (9CI) (CA INDEX NAME)

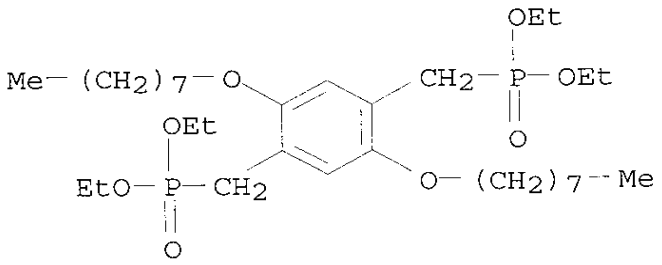
CM 1

CRN 176856-38-5
CMF C26 H16 O2 S2



CM 2

CRN 176856-31-8
CMF C32 H60 O8 P2



IC ICM C08G061-00
ICS C09K011-06; C07D417-14; C07D409-06; C07D407-08; H05B033-14
ICA C08G061-02; C08G061-12; C07C323-22; C07C319-20; C07C043-205; C07C043-225; C07C041-22; C07C041-30; C07C041-16; C07F009-40; C07D339-08; C07D333-06
CC 37-5 (Plastics Manufacture and Processing)
Section cross-reference(s): 35
IT 41040-04-4P 41040-05-5P 41080-42-6P 41080-43-7P
176856-32-9P, 2,5-Dibenzoylthiophene-2,5-dioctoxy-1,4-xylylenebis(diethyl phosphonate) copolymer 176856-33-0P, 2,5-Dibenzoylthiophene-2,5-dioctoxy-1,4-xylylenebis(diethyl phosphonate) copolymer, sru 176856-34-1P 176856-35-2P
176856-36-3P 176856-37-4P **176856-39-6P**
176856-40-9P 176856-41-0P 176856-42-1P 176856-43-2P
176856-44-3P 176856-46-5P 176856-47-6P 176856-49-8P
176856-50-1P 176856-51-2P 176856-52-3P 176856-53-4P
(prepn. and use as electroluminescent material)

L64 ANSWER 13 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1993:417620 Document No. 119:17620 Organic thin-film electroluminescent elements. Higashi, Hisahiro; Hosokawa, Chishio; Tokailin, Hiroshi (Idemitsu Kosan Co., Ltd., Japan). PCT Int. Appl. WO 9205131 A1 19920402, 143 pp. DESIGNATED STATES: W: JP, US; RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, NL, SE. (Japanese). CODEN: PIXXD2. APPLICATION: WO 1991-JP1228 19910917. PRIORITY: JP 1990-248749 19900920; JP 1990-279304 19901019.
AB The element comprises a phosphor consisting of a dimeric styryl deriv. G(F)C:C(E)DQD'(E')C:C(F')G' (D,D' = (un)substituted C6-20 allylene, C3-20 divalent arom. heterocyclic; E,E',F,F',G,G' = H, C6-20 aryl or cyclohexyl, C1-10 alkyl, C7-20 aralkyl, C1-10 alkoxy, (un)substituted C3-20 monovalent arom. heterocyclic; F and G, or F' and G' are not H simultaneously; substituted groups = C1-6 alkyl, C1-6 alkoxy, C1-6 acyl, C7-8 aralkyl, C6-20 aryloxy, C2-7 alkoxycarbonyl, C7-21 aryloxycarbonyl, C1-6 acyloxy, C1-6 acylamino, halo, carboxyl, aminocarbonyl, OH, CN, NO2, NH2; .gtoreq.1 substituent includes alkyl, alkoxy, aryloxy, NH2, (un)substituted phenyl; E and D, E' and D', F and G, or F' and G' may form (un)satd.

5- or 6-membered rings; Q = divalent group. The element, suited for use in a variety of display devices, is prepd. by bonding 2 mols. of a compd. having a good luminescence efficiency via the Q group without impairing the abilities of the compd., thereby improving thin-film characteristics.

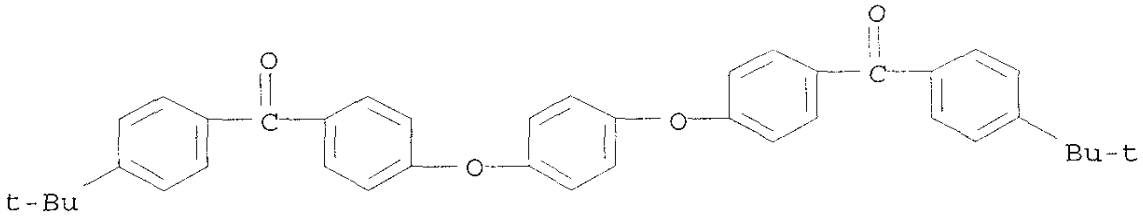
IT **146997-01-5P**
(prepn. and use of, as electroluminescent phosphors, greenish-blue-emitting)

RN 146997-01-5 HCAPLUS

CN Phosphonic acid, [[1,1'-biphenyl]-4,4'-diylbis(methylene)]bis-, tetraethyl ester, polymer with [1,4-phenylenebis(oxy-4,1-phenylene)]bis[[4-(1,1-dimethylethyl)phenyl]methanone] (9CI) (CA INDEX NAME)

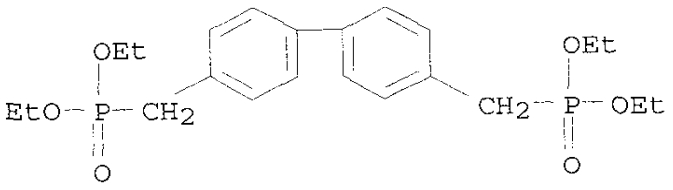
CM 1

CRN 146823-44-1
CMF C40 H38 O4



CM 2

CRN 17919-34-5
CMF C22 H32 O6 P2



IC ICM C07C013-28
ICS C07C015-50; C07C001-32; C07C043-243; C07C041-01; C07C049-84; C07C045-68; C07D209-86; C07D521-00; C09K011-06; C09B023-14; H05B033-22

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 74

IT **146997-01-5P**
(prepn. and use of, as electroluminescent phosphors, greenish-blue-emitting)

L64 ANSWER 14 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

1989:58119 Document No. 110:58119 Bis- or tetra-maleimides of substituted s-triazines chain-extended by imide, amide, and urea groups for fire- and heat-resistant applications. Mikroyannidis, John A.; Melissaris, Anastasios P. (Dep. Chem., Univ. Patras, Patras, 260 01, Greece). Journal of Polymer Science, Part A: Polymer Chemistry, 26(5), 1405-18 (English) 1988. CODEN: JPACEC. ISSN: 0887-624X.

AB Novel phosphorylated bismaleimides and nonphosphorylated tetramaleimides contg. substituted s-triazine rings (chain-extended by imide, amide, or urea groups) were prepd. and polymd. These polymer precursors were prepd. by treating 2,4-bis(4-aminophenoxy)-6-diethoxyphosphinyl-s-triazine or 2,4,6-tris(4-aminophenoxy)-s-triazine with maleic anhydride in combination with a bridging agent such as pyromellitic or benzophenone tetracaboxylic dianhydride, terephthaloyl chloride, and TDI. The structure of polymer precursors was confirmed by IR and 1H-NMR spectroscopy and their curing behavior was investigated by DTA. The phosphorylated bismaleimides thermally polymd. at a lower temp. than did the corresponding nonphosphorylated tetramaleimides. Dynamic TGA showed that the nonphosphorylated and phosphorylated cured resins were stable up to 320-370 and 312-327.degree., resp., in N or air atm. In addn., the latter afforded a relatively higher char yield. The relative thermal and thermooxidative stability of polymers with regard to the chem. structure of the bridging group decreased in the order imide > amide > urea. Upon isothermal aging, the phosphorylated polymers exhibited a lower wt. loss than did the corresponding nonphosphorylated polymers.

IT **118363-52-3P**
(prepn. and thermal stability of)

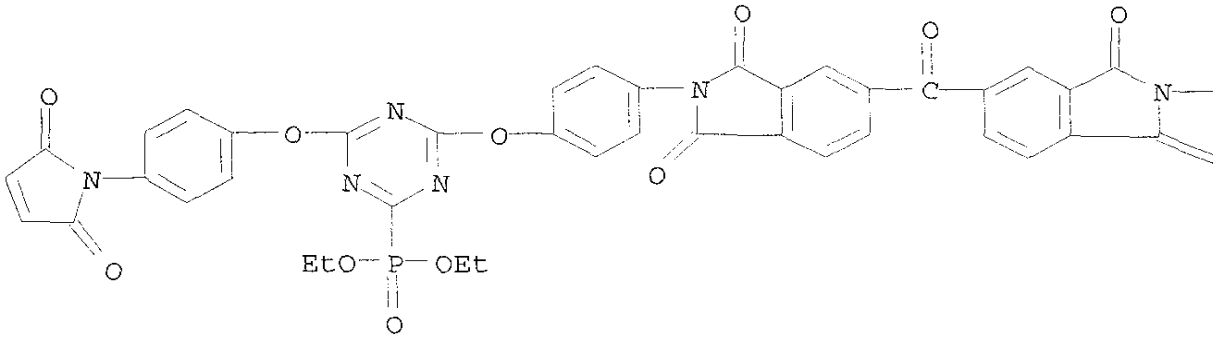
RN 118363-52-3 HCAPLUS

CN Phosphonic acid, [carbonylbis[(1,3-dihydro-1,3-dioxo-2H-isoindole-5,2-diyl)-4,1-phenyleneoxy[6-[4-(2,5-dihydro-2,5-dioxo-1H-pyrrol-1-yl)phenoxy]-1,3,5-triazine-4,2-diyl]]]bis-, tetraethyl ester, homopolymer (9CI) (CA INDEX NAME)

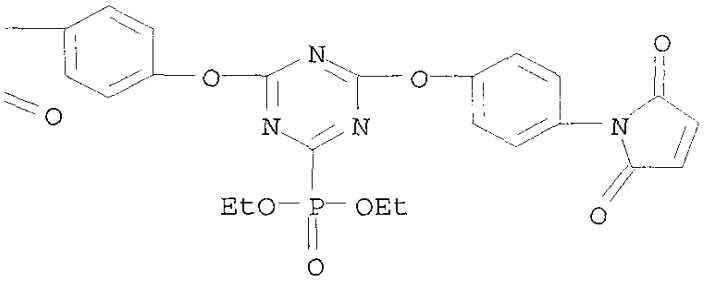
CM 1

CRN 118363-51-2
CMF C63 H46 N10 O19 P2

PAGE 1-A



PAGE 1-B



CC 35-2 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 37

IT 118363-44-3P 118363-46-5P 118363-48-7P 118363-50-1P
118363-52-3P 118363-54-5P 118626-35-0P 118626-36-1P
(prepn. and thermal stability of)

L64 ANSWER 15 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1988:187354 *Document No. 108:187354* Synthesis, physical and thermal characterization of phosphorus-containing homopolymers and copolymers based on 2,4-bis(4-aminophenoxy)-6-diethoxyphosphinyl-s-triazine. Melissaris, Anastasios P.; Mikroyannidis, John A. (Dep. Chem., Univ. Patras, Patras, 260 01, Greece). Journal of Applied Polymer Science, 35(3), 831-45 (English) 1988. CODEN: JAPNAB. ISSN: 0021-8995.

AB Phosphorus-contg. polyimides, polyamides, and polyureas were prepd. by reacting 2,4-bis(4-aminophenoxy)-6-diethoxyphosphinyl-s-triazine with pyromellitic or benzophenonetetracarboxylic dianhydride, terephthaloyl chloride, and TDI, resp. These polymers were characterized by inherent viscosity measurements, IR and 1H-NMR spectroscopy as well as by DTA and TGA. The copolymers were stable

up to 233-272.degree. in N or air atm.

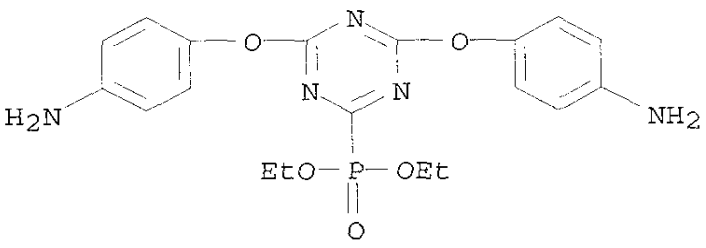
IT **114178-72-2P 114178-74-4P 114178-75-5P**
114178-76-6P 114178-84-6P 114188-50-0P
(prepn. and characterization of)

RN 114178-72-2 HCAPLUS

CN 1H,3H-Benzo[1,2-c:4,5-c']difuran-1,3,5,7-tetrone, polymer with diethyl [4,6-bis(4-aminophenoxy)-1,3,5-triazin-2-yl]phosphonate and 4,4'-sulfonylbis[benzenamine] (9CI) (CA INDEX NAME)

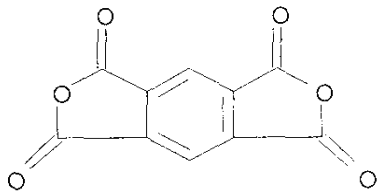
CM 1

CRN 114166-89-1
CMF C19 H22 N5 O5 P



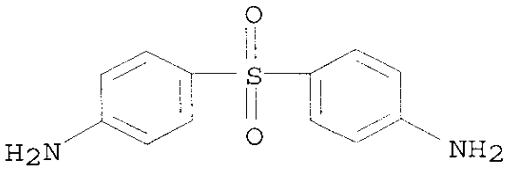
CM 2

CRN 89-32-7
CMF C10 H2 O6



CM 3

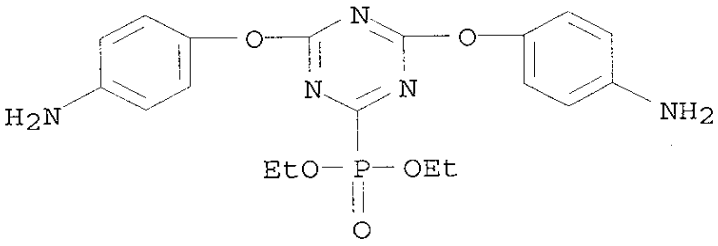
CRN 80-08-0
CMF C12 H12 N2 O2 S



RN 114178-74-4 HCAPLUS
CN Phosphonic acid, [4,6-bis(4-aminophenoxy)-1,3,5-triazin-2-yl]-, diethyl ester, polymer with 5,5'-carbonylbis[1,3-isobenzofurandione] (9CI) (CA INDEX NAME)

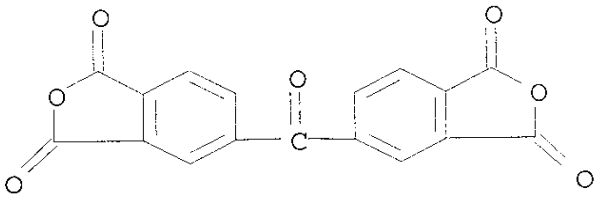
CM 1

CRN 114166-89-1
CMF C19 H22 N5 O5 P



CM 2

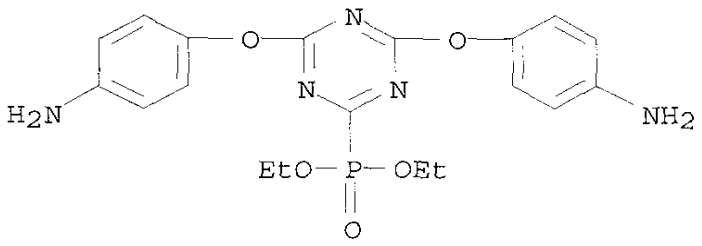
CRN 2421-28-5
CMF C17 H6 O7



RN 114178-75-5 HCAPLUS
CN 1,3-Isobenzofurandione, 5,5'-carbonylbis-, polymer with diethyl [4,6-bis(4-aminophenoxy)-1,3,5-triazin-2-yl]phosphonate and 4,4'-sulfonylbis[benzenamine] (9CI) (CA INDEX NAME)

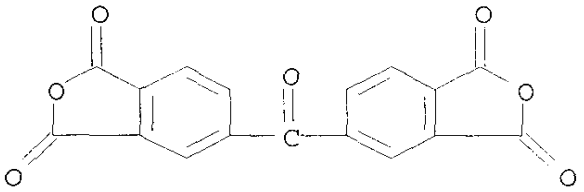
CM 1

CRN 114166-89-1
CMF C19 H22 N5 O5 P



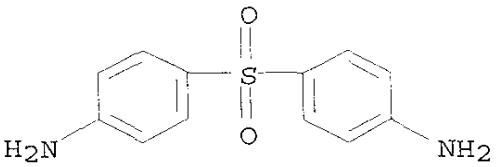
CM 2

CRN 2421-28-5
CMF C17 H6 O7



CM 3

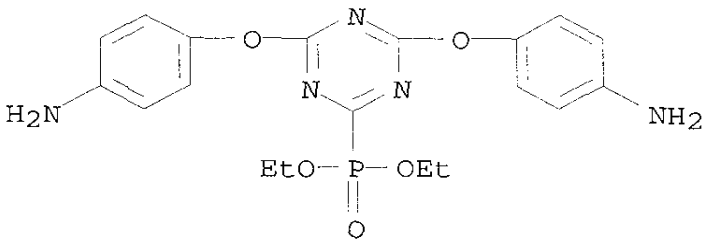
CRN 80-08-0
CMF C12 H12 N2 O2 S



RN 114178-76-6 HCAPLUS
CN 1,4-Benzenedicarbonyl dichloride, polymer with diethyl [4,6-bis(4-aminophenoxy)-1,3,5-triazin-2-yl]phosphonate and 4,4'-sulfonylbis[benzenamine] (9CI) (CA INDEX NAME)

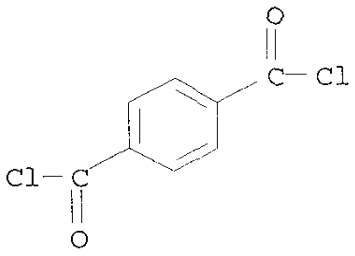
CM 1

CRN 114166-89-1
CMF C19 H22 N5 O5 P



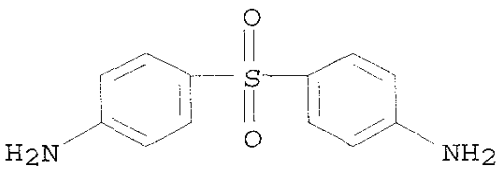
CM 2

CRN 100-20-9
CMF C8 H4 Cl2 O2



CM 3

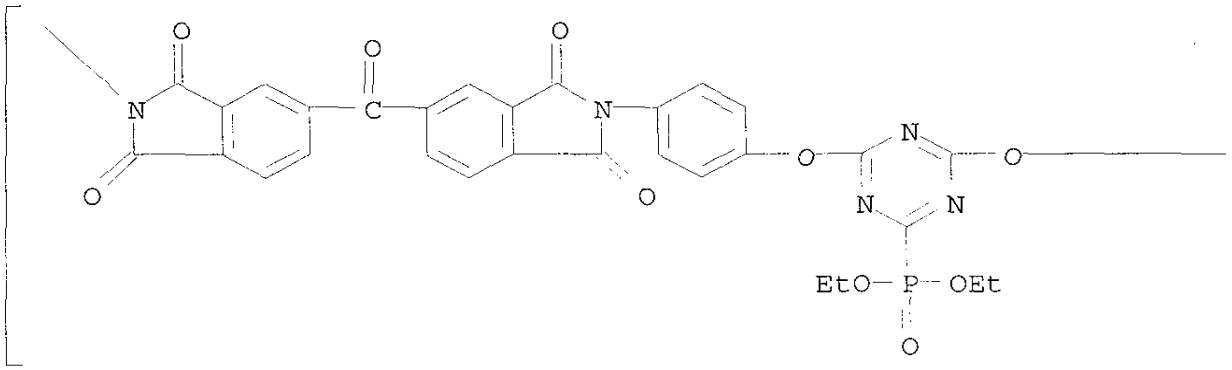
CRN 80-08-0
CMF C12 H12 N2 O2 S



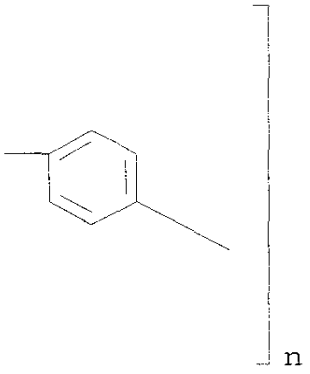
RN 114178-84-6 HCAPLUS
CN Poly[(1,3-dihydro-1,3-dioxo-2H-isoindole-2,5-diyl)carbonyl(1,3-dihydro-1,3-dioxo-2H-isoindole-5,2-diyl)-1,4-phenyleneoxy[6-(diethoxyphosphinyl)-1,3,5-triazine-2,4-diyl]oxy-1,4-phenylene]

(9CI) (CA INDEX NAME)

PAGE 1-A



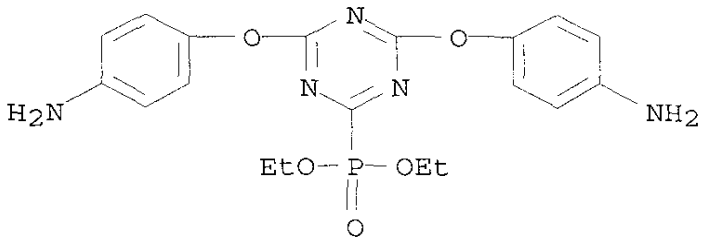
PAGE 1-B



RN 114188-50-0 HCAPLUS
CN Phosphonic acid, [4,6-bis(4-aminophenoxy)-1,3,5-triazin-2-yl]-, diethyl ester, polymer with 1,3-diisocyanatomethylbenzene and 4,4'-sulfonylbis[benzenamine] (9CI) (CA INDEX NAME)

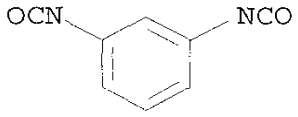
CM 1

CRN 114166-89-1
CMF C19 H22 N5 O5 P



CM 2

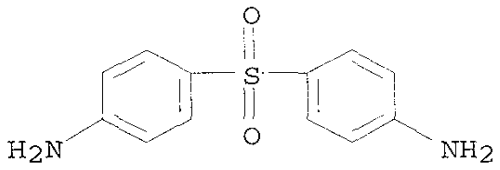
CRN 26471-62-5
CMF C9 H6 N2 O2
CCI IDS



D1—Me

CM 3

CRN 80-08-0
CMF C12 H12 N2 O2 S



CC 35-5 (Chemistry of Synthetic High Polymers)
IT 114166-90-4P 114178-71-1P **114178-72-2P** 114178-73-3P
114178-74-4P 114178-75-5P 114178-76-6P
114178-82-4P 114178-83-5P **114178-84-6P**
114188-50-0P 114265-73-5P
(prepn. and characterization of)

L64 ANSWER 16 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

1988:6528 Document No. 108:6528 Polymerization of maleimides containing s-triazine rings in presence of aromatic di- or triamines. Melissaris, Anastasios P.; Mikroyannidis, John A. (Dep. Chem., Univ. Patras, Patras, GR-260 01, Greece). Polymer Bulletin (Berlin, Germany), 18(1), 1-8 (English) 1987. CODEN: POBUDR. ISSN: 0170-0839.

AB 2,4,6-Tris[4-(maleimido)phenoxy]-s-triazine or 2,4-bis[4-(maleimido)phenoxy]-6-diethoxyphosphinyl-s-triazine was polymd. with various arom. di- or triamines. The maleimide-amine adducts initiated a thermal polymn. at lower temp. than did the corresponding neat maleimides. The thermal stability of cured resins was evaluated by thermogravimetric anal. The cured resins derived from the maleimide-amine adducts were less thermally stable than those of the corresponding neat maleimides. The initial decompn. temp. of the polymers obtained from the maleimide-amine adducts was not remarkably influenced by the chem. structure of the arom. amine utilized.

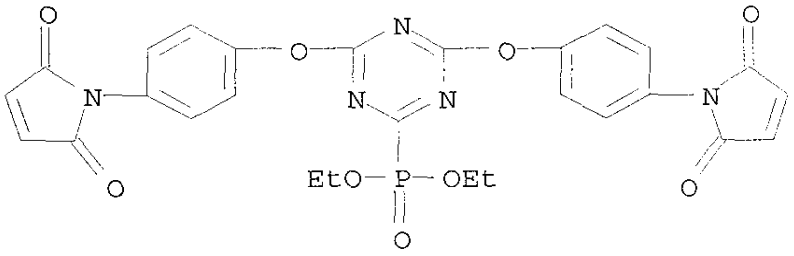
IT **111939-99-2P**
(prepn. and thermogravimetric anal. of)

RN 111939-99-2 HCAPLUS

CN Phosphonic acid, [4,6-bis[4-(2,5-dihydro-2,5-dioxo-1H-pyrrol-1-yl)phenoxy]-1,3,5-triazin-2-yl]-, diethyl ester, polymer with 4,4'-sulfonylbis[benzenamine] (9CI) (CA INDEX NAME)

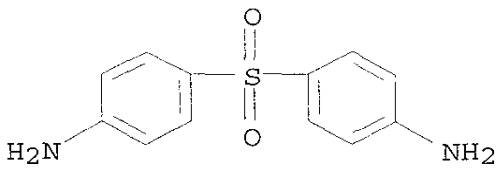
CM 1

CRN 111939-96-9
CMF C27 H22 N5 O9 P



CM 2

CRN 80-08-0
CMF C12 H12 N2 O2 S



CC 35-4 (Chemistry of Synthetic High Polymers)
IT 111939-92-5P 111939-93-6P 111939-94-7P 111939-95-8P
111939-97-0P 111939-98-1P **111939-99-2P** 111940-00-2P
(prepn. and thermogravimetric anal. of)

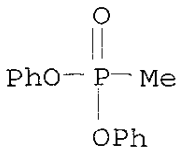
L64 ANSWER 17 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1985:505648 Document No. 103:105648 Aromatic polyphosphonates: exceptionally flame-resistant thermoplastic polymers. Schmidt, Manfred; Freitag, Dieter; Bottenbruch, Ludwig; Reinking, Klaus (Ressorts Forsch., Bayer A.-G., Krefeld-Uerdingen, D-4150, Fed. Rep. Ger.). Angewandte Makromolekulare Chemie, 132, 1-18 (German) 1985. CODEN: ANMCBO. ISSN: 0003-3146.

AB Branched thermoplastic high-mol.-wt. arom. polyphosphonates having good processability and impact, heat, and flame resistance were synthesized by polycondensation of arom. diols. with di-Ph phosphonates in the presence of an alk. polymn. catalyst and <1 mol% crosslinking agent. Pyrolysis of poly(4,4'-dioxybiphenyl methylphosphonate) (I) [57389-44-3] in air at 1000.degree. yielded gases contg. 66% of the polymer-bound P as H3PO4 and (HO)2P(O)Me. I showed no viscosity change after soaking 4 days at room temp. in H2O. Heat resistance of the polyphosphonates was increased by incorporating (PhO)2CO or a 50:50 mixt. of iso-/terephthalic acid into the polymer backbone, giving amorphous thermoplastic polycarbonate- or polyester-polyphosphonates with analogous properties to the original polyphosphonates.

IT **97916-84-2P**
(prepn. of branched, thermoplastic, heat- and flame-resistant)
RN 97916-84-2 HCAPLUS
CN Carbonic acid, diphenyl ester, polymer with 1,4-benzenediol, diphenyl methylphosphonate, 4,4'-(1-methylethylidene)bis[phenol] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

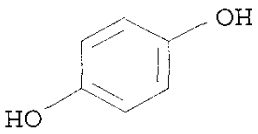
CM 1

CRN 7526-26-3
CMF C13 H13 O3 P



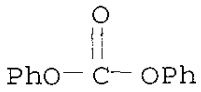
CM 2

CRN 123-31-9
CMF C6 H6 O2



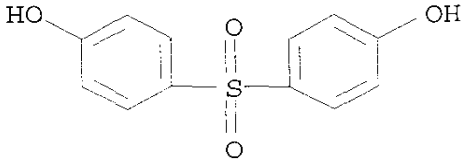
CM 3

CRN 102-09-0
CMF C13 H10 O3



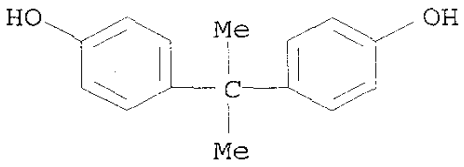
CM 4

CRN 80-09-1
CMF C12 H10 O4 S



CM 5

CRN 80-05-7
CMF C15 H16 O2



CC 37-5 (Plastics Manufacture and Processing)
IT 27734-80-1P 31868-41-4P 35398-61-9P 56266-19-4P 57389-44-3P
68664-06-2P 77226-90-5P 79313-99-8P 86228-20-8P 97916-72-8P
97916-73-9P 97916-74-0P 97916-75-1P 97916-76-2P 97916-77-3P
97916-78-4P 97916-79-5P 97916-80-8P 97916-81-9P 97916-82-0P
97916-83-1P **97916-84-2P** 97916-85-3P 97916-86-4P
97917-28-7P 97917-29-8P
(prepn. of branched, thermoplastic, heat- and flame-resistant)

=> d l56 1-12 ti

L56 ANSWER 1 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI An innovative method for the preparation of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors

L56 ANSWER 2 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI Ion conducting composite membrane materials containing an optionally modified zirconium phosphate dispersed in a polymeric matrix, preparation of membrane material, and use

L56 ANSWER 3 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI **Proton-conductive** polymer membrane and its use in **fuel cell**

L56 ANSWER 4 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI Thermally crosslinkable polymer solid electrolyte for **fuel cell**, polymer solid electrolyte film, and manufacture thereof

L56 ANSWER 5 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI Photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film, photocrosslinking polymer solid electrolyte film, and manufacture thereof,

L56 ANSWER 6 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI **Proton-conducting** sulfonated **polysulfone -polyethers** and polyketone-polyethers as **fuel cell** separators

L56 ANSWER 7 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI **Proton-conductive** membrane for electrochemical applications

L56 ANSWER 8 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI Oligomeric **proton-conducting** polyimide and acid-functionalized block copolymers as **fuel cell** polymer separators

L56 ANSWER 9 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI Aromatic polyether containing **phosphonate** groups and a process for the manufacture thereof

L56 ANSWER 10 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI Synthesis and **proton conductivities** of **phosphonic** acid containing poly-(arylene ether)s

L56 ANSWER 11 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI Solid polymer electrolyte having high-durability

L56 ANSWER 12 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI Composite solid polymer electrolyte membranes

=> d l56 1,3,4,5,6,7,9,10,12 cbib abs hitstr hitind

L56 ANSWER 1 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:778142 An innovative method for the preparation of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors. Alberti, Giulio; Casciola, Mario; Pica, Monica (Fuma-Tech G.m.b.H., Germany). PCT Int. Appl. WO 2003081691 A2 20031002, 31 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2003-EP2904 20030320. PRIORITY: IT 2002-PG15 20020322.

AB The invention is based on the prepn. of an org. soln. of preferably **phosphonic** acids and tetravalent metals salts, preferably of Zr, Ti, Sn and Ce, in org. solvents, which behaves as a soln. of layered tetravalent metals salts, preferably phosphate-**phosphonates**, which are completely insol. in the known solvents. This peculiarity allows an easy insertion of particles of the above compds. in the pores of porous membranes, in the matrixes of those polymers, which are sol. in the same org. solvents, as well as in the membrane/electrode interfaces of **fuel**

cells. The use of tetravalent metals salts, preferably zirconium phosphate-**phosphonates**, possessing high **proton cond**. (in some cases higher than 10-1 S cm-1) allows the prepn. of impregnated porous membranes and of nano-polymeric membranes combining good mech. properties, and/or reduced permeability to gaseous species, with good **proton cond**. These membranes can therefore be employed in **fuel cells** even at temps. higher than 80.degree.. These membranes also possess a high catalytic activity and can therefore be employed in catalytic membrane reactors.

IC ICM H01M

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 47

ST **fuel cell** use conducting nanopolymeric membrane prepn; catalytic membrane reactor use conducting nanopolymeric membrane prepn; zirconium phosphate **phosphonate** conducting nanopolymeric membrane

IT Pore
(dimension; innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT Polyoxyalkylenes
(fluorine- and sulfo-contg., ionomers; innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT Ceramic membranes
Solid state **fuel cells**
(innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT Chlorides
Fluoro rubber
Metal alkoxides
Phosphates
Polyesters
(innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT Reactors
(membrane, catalytic; innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT Sulfonic acids
(perfluorosulfonic acid polymers; innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT Polyketones
Polysulfones
(**polyether**-, sulfonated; innovative method for prepn.

of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT **Polysulfones**
(**polyether**-; innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT Polyethers
(polyketone-, sulfonated; innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT Fluoropolymers
(polyoxyalkylene-, sulfo-contg., ionomers; innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-contg.; innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT **Polyethers**
(**polysulfone**-, sulfonated; innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT **Polyethers**
(**polysulfone**-; innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT Carboxylic acids
(salts; innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT Fluoropolymers
(sulfo-contg., perfluoro; innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT 60-35-5, Acetamide 67-68-5, Dmso 68-12-2, Dmf 75-05-8, Acetonitrile 123-91-1, Dioxan 872-50-4, n-Methyl-2-pyrrolidone 7440-31-5D, Tin, salts 7440-32-6D, Titanium, salts 7440-45-1D, Cerium, salts 7440-67-7D, Zirconium, salts 7699-43-6, Zirconyl chloride 9002-84-0, Ptfe 15477-76-6, **phosphonate** 24937-79-9, Pvdf 25710-96-7, Zirconium propionate 93615-63-5, nafion 1100
(innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT 13772-29-7DP, solid soln. with zirconium phosphate and **phosphonate** contg. org. diacids 116405-42-6P 131249-73-5DP, solid soln. with zirconium phosphate and **phosphonate** contg. org. diacids 608103-65-7DP, solid soln. with zirconium phosphate and **phosphonate** contg. org. diacids 608103-65-7P
(innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT 24937-79-9D, Polyvinylidene fluoride, sulfonated
(innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

IT 67-56-1, Methanol 1333-74-0, Hydrogen
(innovative method for prepn. of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors)

L56 ANSWER 3 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:628405 Document No. 139:166954 **Proton-conductive** polymer membrane and its use in **fuel cell**. Kuromatsu, Hidehisa; Minamimura, Kiyoyuki (Kanegafuchi Chemical Industry Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003229143 A2 20030815, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-29044 20020206.

AB The membrane contains polymers having SO3H-contg. arom. rings and has P content 0.001-5%. The membrane has high **proton cond.** and oxidn. resistance and is useful for an electrolyte in a solid polymer **fuel cell**.

IC ICM H01M008-02
ICS C08J005-22; C08K003-32; C08L043-02; C08L081-04; C08L101-02; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 76

ST **fuel cell** electrolyte **proton conductive** polymer membrane

IT **Polysulfones**, uses
(**polyether**-, arom., sulfonated; **proton-conductive** sulfo-contg. arom. ring polymer membrane for **fuel cell** electrolyte with high oxidn. resistance)

IT **Polyethers**, uses
(**polysulfone**-, arom., sulfonated; **proton-conductive** sulfo-contg. arom. ring polymer membrane for **fuel cell** electrolyte with high oxidn. resistance)

IT **Fuel cell** electrolytes
(**proton-conductive** sulfo-contg. arom. ring polymer membrane for **fuel cell** electrolyte with high oxidn. resistance)

IT Ionic **conductors**
(**protonic**; **proton-conductive**

sulfo-contg. arom. ring polymer membrane for **fuel cell** electrolyte with high oxidn. resistance)

IT Polythiophenylenes
(sulfonated; **proton-conductive** sulfo-contg. arom. ring polymer membrane for **fuel cell** electrolyte with high oxidn. resistance)

IT 9016-75-5DP, Poly(phenylene sulfide), sulfonated
(Torelina; **proton-conductive** sulfo-contg. arom. ring polymer membrane for **fuel cell** electrolyte with high oxidn. resistance)

IT 1343-93-7 27754-99-0, Poly(**vinylphosphonic** acid)
(membrane contg.; **proton-conductive** sulfo-contg. arom. ring polymer membrane for **fuel cell** electrolyte with high oxidn. resistance)

IT 25667-42-9DP, sulfonated
(**proton-conductive** sulfo-contg. arom. ring polymer membrane for **fuel cell** electrolyte with high oxidn. resistance)

L56 ANSWER 4 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:586587 Document No. 139:152288 Thermally crosslinkable polymer solid electrolyte for **fuel cell**, polymer solid electrolyte film, and manufacture thereof. Kitamura, Kota; Takase, Satoshi; Sakaguchi, Yoshimitsu; Nagahara, Shigenori; Hamamoto, Shiro; Nakao, Junko (Toyobo Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003217343 A2 20030731, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-15987 20020124.

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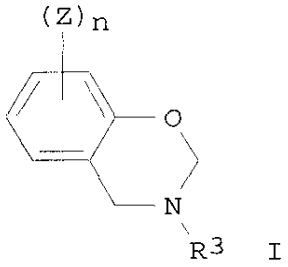

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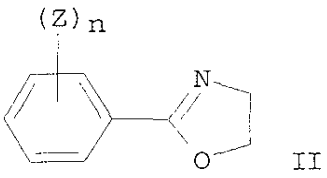


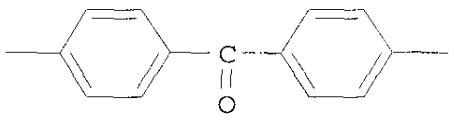
II

AB The thermally crosslinkable polymer solid electrolyte has .gtoreq.1 ionic group and .gtoreq.1 thermally crosslinkable group in the mol. The ionic group may be sulfonic acid or **phosphonic** acid group. Thermally crosslinkable group may be -C6H4(Z)n-C.tplbond.R1, -C6H4(Z)n-OCH2-C.tplbond.R2, I -C6H4(Z)n-CR6=CR4R5, CH2-CR9=CR8R7, or II (Z = mH, C12-10 hydrocarbon, halo, etc.; R1-9 = H, C1-10 alkyl, Ph, etc.; X = H, monovalent metal ion; and n = integer 1-4). The polymer backbone chain may be polyethersulfone or polyether ketone.

IC ICM H01B001-06

ICS C08G065-40; C08G075-23; C08J005-22; H01B013-00; H01M008-02; H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35, 38
ST thermally crosslinkable polymer solid electrolyte **fuel cell**
IT Polyketones
Polysulfones, uses
(**polyether**-; thermally crosslinkable polymer solid electrolyte for **fuel cell**)
IT Polyethers, uses
(polyketone-; thermally crosslinkable polymer solid electrolyte for **fuel cell**)
IT **Polyethers**, uses
(**polysulfone**-; thermally crosslinkable polymer solid electrolyte for **fuel cell**)
IT **Fuel cell** electrolytes
Fuel cells
(thermally crosslinkable polymer solid electrolyte for **fuel cell**)
IT 569346-21-0DP, Disodium 4,4'-dichlorodiphenylsulfone-3,3'-disulfonate-4,4'-dichlorodiphenylsulfone-biphenol copolymer, reaction product with 4-ethynylphenol
(crosslinked; thermally crosslinkable polymer solid electrolyte for **fuel cell**)

L56 ANSWER 5 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:586586 Document No. 139:124155 Photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film, photocrosslinking polymer solid electrolyte film, and manufacture thereof,. Kitamura, Kota; Takase, Satoshi; Sakaguchi, Yoshimitsu; Nagahara, Shigenori; Hamamoto, Shiro; Nakao, Junko (Toyobo Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003217342 A2 20030731, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-15986 20020124.
GI



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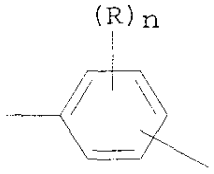


II

AB The photocrosslinking polymer solid electrolyte contains .gtoreq.1 ionic group and .gtoreq.1 photocrosslinkable group om the mol. The ionic group may be sulfonic acid or **phosphonic** acid. The photocrosslinkable group may be represented by I and II (R = C1-10 aliph. hydrocarbon; and n = integer 1-4). The polymer backbone

chain may be polyethersulfone or polyether ketone. The photocrosslinking polymer solid electrolyte exhibited not only excellent ionic cond. but also showed swelling resistance.

IC ICM H01B001-06
ICS C08G065-40; C08G075-23; H01B013-00; H01M008-02; H01M008-10

CC 72-2 (Electrochemistry)
Section cross-reference(s): 35, 38

ST photocrosslinkable polymer solid electrolyte **fuel cell** proton exchange film; polyethersulfone polyether ketone polymer solid electrolyte

IT **Fuel cells**
Polymer electrolytes
(photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)

IT Polyketones
Polysulfones, uses
(**polyether**-; photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)

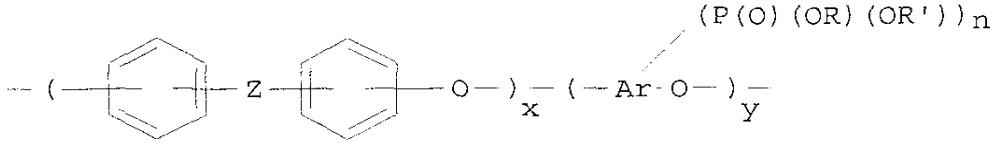
IT Polyethers, uses
(polyketone-; photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)

IT **Polyethers**, uses
(**polysulfone**-; photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)

IT 565221-52-5P
(photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)

L56 ANSWER 6 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:554038 Document No. 139:119905 **Proton-conducting** sulfonated **polysulfone-polyethers** and polyketone-polyethers as **fuel cell** separators. Sasaki, Shigeru; Yashiro, Arihiro; Hidaka, Yasuaki; Taniguchi, Yakumi (Sumitomo Chemical Company Limited, Japan). Fr. Demande FR 2834716 A1 20030718, 36 pp. (French). CODEN: FRXXBL. APPLICATION: FR 2003-385 20030115. PRIORITY: JP 2002-5797 20020115; JP 2002-5796 20020115.

GI



I

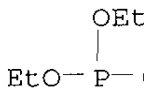
AB **Proton-conducting** polymer membranes, esp. for **fuel cells**, are **phosphonic** acid-contg.

polyether-polyketones or **polyether-polysulfones**, of general structure I, in which Z = -SO2- or -C(:O)-; x and y = 0.01-0.99 (x + y = 1); -Ar- is a C4-18-arylene and can contain heteroatoms; n .ltoreq.8; and R and R' = H or alkyl, in addn. to at least one other component selected from phosphoric acid (or deriv.) and a polymer electrolyte. The polymer has a **proton cond.** of .gtoreq.1 .times. 10-4 S/cm. The phosphoric acid deriv. has the general formula O:P(OR2)k(OH)3-k, in which R2 = C1-6-alkyl or an aryl group, and; k = 0-2. The **phosphonic** acid groups are grafted onto the polymer by bromination with N-bromosuccinimide, followed by reaction with tri-Et phosphite in the presence of NiCl2.

IT **122-52-1DP**, Triethyl phosphite, reaction products with sulfonated brominated **polysulfone-polyethers**
(membranes; **proton-conducting** sulfonated **polysulfone-polyethers** and polyketone-polyethers as **fuel cell** separators)

RN 122-52-1 HCAPLUS

CN Phosphorous acid, triethyl ester (8CI, 9CI) (CA INDEX NAME)



IC ICM C08L071-12
ICS C08K005-521; C08J005-22; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST **fuel cell proton conducting** membrane **polysulfone polyether**; sulfonated **polysulfone polyether fuel cell** membrane; polyketone polyether **fuel cell proton conducting** membrane

IT Polyketones
Polysulfones, uses
(**polyether**-, arom., sulfonated, **phosphonic** acid-contg.; **proton-conducting** sulfonated **polysulfone-polyethers** and polyketone-polyethers as **fuel cell** separators)

IT **Polysulfones**, uses
(**polyether**-polyoxyphenylene-, arom., block, sulfonated, **phosphonic** acid-contg.; **proton-conducting** sulfonated **polysulfone-polyethers** and polyketone-polyethers as **fuel cell** separators)

IT Polyoxyphenylenes
(**polyether-polysulfone**-, arom., block, sulfonated, **phosphonic** acid-contg.; **proton-conducting** sulfonated **polysulfone-polyethers** and polyketone-polyethers as **fuel**

cell separators)
IT Polyethers, uses
(polyketone-, arom., sulfonated, phosphonic acid-contg.; proton-conducting sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
IT Polyethers, uses
(polyoxyphenylene-polysulfone-, arom., block, sulfonated, phosphonic acid-contg.; proton-conducting sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
IT Polyethers, uses
(polysulfone-, arom., sulfonated, phosphonic acid-contg.; proton-conducting sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
IT Fluoropolymers, uses
(porous substrates; proton-conducting sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
IT Fuel cell separators
(proton-conducting sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
IT Ionic conductivity
(proton; proton-conducting sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
IT 122-52-1DP, Triethyl phosphite, reaction products with sulfonated brominated polysulfone-polyethers
25839-81-0DP, Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene), sulfonated, brominated, reaction products with tri-Et phosphite 83094-08-0DP, sulfonated
83094-08-0DP, sulfonated, brominated, reaction products with tri-Et phosphite
(membranes; proton-conducting sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
IT 13598-36-2DP, Phosphonic acid, aryl and polymeric derivs.
174899-22-0DP, sulfonated
(membranes; proton-conducting sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)

L56 ANSWER 7 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:352062 Document No. 138:354944 Proton-conductive membrane for electrochemical applications.
Jakoby, Kai; Nunes, Suzana Pereira; Peinemann, Klaus-Victor (GKSS-Forschungszentrum Geesthacht G.m.b.H., Germany). Ger. Offen.

DE 10148131 A1 20030508, 4 pp. (German). CODEN: GWXXBX.
APPLICATION: DE 2001-10148131 20010928.

AB A **proton-conductive** membranes for electrochem. applications, in particular for **fuel cells**, are manufd. by attaching **phosphonic** acid groups to arom. rings of nonvinyl polymers such as polysulfones without spacer groups between the rings and the **phosphonic** acid groups. Optionally, the polymers also have sulfonic acid groups directly bonded to the arom. rings.

IC ICM C08J005-22
ICS C08G075-20; B01D071-82; H01M008-02

CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52

ST polysulfone **phosphonated proton conductive** membrane **fuel cell**; sulfonated **phosphonated** polymer **proton conductive** membrane **fuel cell**

IT Polysulfones, uses
(**phosphonic** acid derivs.; **proton-conductive** membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)

IT **Polysulfones**, uses
(**polyether**-, **phosphonic** acid derivs.; **proton-conductive** membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)

IT **Polyethers**, uses
(**polysulfone**-, **phosphonic** acid derivs.; **proton-conductive** membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)

IT **Fuel cells**
Ionic **conductors**
Membranes, nonbiological
(**proton-conductive** membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)

IT 25839-81-0DP, **phosphonic** acid derivs.
(**proton-conductive** membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)

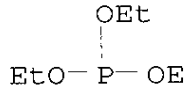
L56 ANSWER 9 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
2002:693172 Document No. 137:201741 Aromatic polyether containing **phosphonate** groups and a process for the manufacture thereof. Sasaki, Shigeru; Yashiro, Arihiro; Hidaka, Yasuaki (Sumitomo Chemical Company, Limited, Japan). Eur. Pat. Appl. EP 1238998 A1 20020911, 15 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR. (English). CODEN: EPXXDW. APPLICATION: EP 2002-3124 20020213. PRIORITY: JP 2001-38116 20010215; JP 2001-125501 20010424; JP 2001-379819 20011213.

AB Provided is an arom. polymer **phosphonic** acid deriv. in which a **phosphonic** acid deriv. group is directly bound to an arom. ring. The arom. polymer **phosphonic** acid deriv. can be produced by brominating a specific arom. polymer compd. with a brominating agent, then acting thereon trialkyl phosphite in the presence of a nickel halide catalyst to give a **phosphonic** acid di-ester, and further, by hydrolyzing the di-ester. The arom. polymer **phosphonic** acid deriv. is excellent in radical resistance and used for a solid polymer type **fuel cell**. A polymer with repeating unit p-C6H4SO2-p-C6H4O-p-C6H4-pC6H4O was brominated with N-bromosuccinimide, then treated with tri-Et phosphate.

IT **122-52-1DP**, Triethyl phosphite, reaction products with brominated **polyether-polysulfones**
(arom. **polyether** contg. **phosphonate** groups and a process for the manuf. thereof)

RN 122-52-1 HCAPLUS

CN Phosphorous acid, triethyl ester (8CI, 9CI) (CA INDEX NAME)



IC ICM C08G075-23
ICS C08G065-48; B01D071-52; B01D071-68

CC 35-5 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 52

ST arom polyether **phosphonate** group electrolyte membrane

IT Bromination
Polymer electrolytes
(arom. polyether contg. **phosphonate** groups and a process for the manuf. thereof)

IT Polyoxyarylenes
(**phosphonate** group-contg.; arom. polyether contg. **phosphonate** groups and a process for the manuf. thereof)

IT **Polysulfones**, preparation
(**polyether**-, **phosphonate** group-contg.; arom. polyether contg. **phosphonate** groups and a process for the manuf. thereof)

IT Membranes, nonbiological
(polymer electrolyte; arom. polyether contg. **phosphonate** groups and a process for the manuf. thereof)

IT **Polyethers**, preparation
(**polysulfone**-, **phosphonate** group-contg.; arom. polyether contg. **phosphonate** groups and a process for the manuf. thereof)

IT 7718-54-9, Nickel (II) chloride, uses
(arom. polyether contg. **phosphonate** groups and a process for the manuf. thereof)

IT **122-52-1DP**, Triethyl phosphite, reaction products with

brominated **polyether-polysulfones**
25839-81-0DP, brominated, reaction products with tri-Et phosphite
83094-08-0DP, 4,4'-Biphenol-4,4'-dichlorodiphenyl
sulfone-4,4'-dihydroxydiphenyl sulfone copolymer, brominated
(arom. **polyether** contg. **phosphonate** groups
and a process for the manuf. thereof)

L56 ANSWER 10 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
2001:670069 Document No. 135:372092 Synthesis and **proton conductivities** of **phosphonic** acid containing poly-(arylene ether)s. Meng, Y. Z.; Tjong, S. C.; Hay, A. S.; Wang, S. J. (Guangzhou Institute of Chemistry, Chinese Academy of Sciences, Canton, 510650, Peop. Rep. China). Journal of Polymer Science, Part A: Polymer Chemistry, 39(19), 3218-3226 (English) 2001. CODEN: JPACEC. ISSN: 0887-624X. Publisher: John Wiley & Sons, Inc..

AB A novel **phosphonic** acid contg. bisphenol was successfully synthesized from phenolphthalein and m-**aminophenylphosphonic** acid. A series of homo- and copoly(arylene ether)s contg. **phosphonic** acid groups were prepd. by soln. nucleophilic polycondensation. These **phosphonic** acid-contg. polymers can readily be dissolved in common org. solvents, such as DMSO, N-methyl-2-pyrrolidinone, and N-cyclohexylpyrrolidinone, and can be cast into tough and smooth films. The presence of **phosphonic** acid pendants in the poly(arylene ether)s was confirmed by NMR, matrix-assisted laser desorption/ionization time-of-flight mass spectrometry, and cond. measurements. These poly(arylene ether)s had very high glass transition temps. ranging from 254.degree. to >315.degree. and high mol. wts. The conductivities of the synthesized polymers were analyzed by the Cole-Cole method, and they ranged from 10-5 to 10-6 S cm-1. The synthesized polymers also exhibited good soln. processability.

CC 35-5 (Chemistry of Synthetic High Polymers)

ST polyether arom **phosphonic** acid contg; polyarylene ether **phosphonic** acid contg; ionic cond **phosphonic** acid contg polyether

IT Polymerization
(of **phosphonic** acid-contg. bisphenol with bis(fluorophenyl) sulfone)

IT Absorption
(of water; by **phosphonic** acid-contg. arom. polyethers)

IT **Polysulfones**, preparation
(**polyether**-, **phosphonic** acid group-contg.; synthesis and **proton conductivities** of **phosphonic** acid-contg. arom. polyethers)

IT **Polyethers**, preparation
(**polysulfone**-, **phosphonic** acid group-contg.; synthesis and **proton conductivities** of **phosphonic** acid-contg. arom. polyethers)

IT Ionic **conductivity**
(**proton**; synthesis and **proton conductivities** of **phosphonic** acid-contg. arom.

polyethers)
IT 7732-18-5, Water, processes
(absorption; of **phosphonic** acid-contg. arom. polyethers)
IT 81-90-3P, Phenolphthalin 142717-68-8P 294212-76-3P
(intermediate; in synthesis of **phosphonic** acid-contg. bisphenol for prepn. of arom. polyethers)
IT 374594-34-0
(monomer; for prepn. of **phosphonic** acid-contg. arom. polyethers)
IT 77-09-8, Phenolphthalein
(reactant; in synthesis of **phosphonic** acid-contg. bisphenol for prepn. of arom. polyethers)
IT 5427-30-5P, 3-**Aminophenylphosphonic** acid
(reactant; in synthesis of **phosphonic** acid-contg. bisphenol for prepn. of arom. polyethers)
IT 374594-35-1P, Bisphenol A-bis(4-fluorophenyl) sulfone-[3-[4,9-bis(4-hydroxyphenyl)-1,3-dioxo-1,3-dihydrobenzo[f]isoindol-2-yl]phenyl] **phosphonic** acid copolymer 374594-36-2P 374594-37-3P
(synthesis and **proton conductivities** of **phosphonic** acid-contg. arom. polyethers)

L56 ANSWER 12 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
2000:260778 Document No. 132:294808 Composite solid polymer electrolyte membranes. Formato, Richard M.; Kovar, Robert F.; Osenar, Paul; Landrau, Nelson; Rubin, Leslie S. (Foster-Miller, Inc., USA). PCT Int. Appl. WO 2000022684 A2 20000420, 95 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1999-US19476 19990826. PRIORITY: WO 1998-US17898 19980828; US 1999-261349 19990303.
AB The present invention relates to composite solid polymer electrolyte membranes (SPEMs) which include a porous polymer substrate (typically a liq. crystal polymer) interpenetrated with an ion-conducting material (typically a perfluorinated ionomer). SPEMs of the present invention are useful in electrochem. applications, including **fuel cells** and electrodialysis.
IC ICM H01M
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52
ST composite solid polymer electrolyte membrane; **fuel cell** polymer electrolyte membrane; electrodialysis polymer electrolyte membrane; liq crystal polymer interpenetrating network electrolyte; perfluorinated ionomer interpenetrating network electrolyte
IT **Fuel cells**
(direct methanol or hydrogen; composite solid polymer electrolyte

membranes)
IT Polyimides, uses
Polyimides, uses
Polyketones
Polyketones
Polysulfones, uses
Polysulfones, uses
(**polyether**-; composite solid polymer electrolyte membranes)
IT **Polyethers**, uses
Polyethers, uses
(**polysulfone**-; composite solid polymer electrolyte membranes)
IT 9003-01-4, Polyacrylic acid 24938-64-5 24938-67-8, Poly[oxy(2,6-dimethyl-1,4-phenylene)] 24938-68-9, 2,6-Diphenylphenol homopolymer, sru 25035-37-4, p-Phenylenediamine-terephthalic acid copolymer 25134-01-4, 2,6-Dimethylphenol homopolymer 26101-52-0, Polyvinyl sulfonic acid 26353-84-4, 2,6-Diphenylphenol homopolymer 27754-99-0, Polyvinyl **phosphonic** acid 50851-57-5, Polystyrene sulfonic acid 264624-35-3, Trifluorostyrenesulfonic acid homopolymer
(composite solid polymer electrolyte membranes)